

TECHNICAL REPORT

**ISO/TR
11071-2**

First edition
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AMENDMENT 1
1999-08-01

Comparison of worldwide lift safety standards —

Part 2: Hydraulic lifts (elevators)

AMENDMENT 1: Reference to Japanese and Australian standards

Comparaison des normes mondiales de sécurité des ascenseurs —

Partie 2: Ascenseurs hydrauliques

AMENDEMENT 1: Référence aux normes japonaises et australiennes



Reference number
ISO 4824:1993/Amd.1:1999(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 ISO technical committees is to prepare International Standards. 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 a 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 Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

ISO/TR 11071-2, including this Amendment A, which is a Technical Report of type 3, 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: 1990, Electric lifts (elevators)*
- *Amendment A: 1997 to Part 1: 1990, Electric lifts (elevators), References to Japanese standards*
- *Amendment B: [in preparation] to Part 1:1990, Electric lifts (elevators), References to Australian Standards.*
- *Part 2: 1997, Hydraulic lifts (elevators)*
- *Amendment A: 1998 to Part 2: 1997, Hydraulic lifts (elevators), References to Japanese and Australian standards.*

Introduction

Technical Report ISO/TR 11071-2:1996 consisted of a comparison of the requirements of selected topics as covered by the following worldwide safety standards for hydraulic lifts (excluding regional or national deviations):

- a) CEN European Standard EN81: Part 2, Lifts and Service Lifts [Edition 1987 as presented in BS5655: Part 2:1988 (excluding national Appendix)]
- b) ASME ASME A17.1 Safety Code for Elevators and Escalators (Edition 1993)
- c) CSA CSA Standard CAN/CSA-B44 Safety Code for Elevators (Edition 1994)

The intent of the Technical Report ISO/TR 11071-2 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 Technical Report ISO/TR 11071-2 did not include the safety requirements and standards used in Japan and Australia.

At the initiative of the ISO Technical Committee 178 experts from the Japanese Elevator Association and Standards Australia provided the ISO/TC 178 Working Group 4 with tables comparing their requirements with those in the three listed safety standards. Please note that since the publication of ISO/TR 11071-2, the ASME and CSA Standards have been revised and new editions/amendments published, which are not included in this amendment.

With Resolution 1996/129 the ISO/TC 178 asked the Working Group 4 to review the material prepared by Japanese and Australian experts and proceed with the publication of Amendment 1 to the ISO/TR 11071-2:1996, rather than to revise and update the whole 1996 edition of the technical report.

This Amendment, as was the case with Technical Report ISO/TR 11071-2, does not intend to replace therein compared safety standards. The information contained in this Amendment does not necessarily represent the opinions of the standards-writing organizations responsible for the development of the safety standards being compared, and they should be consulted regarding interpretations of their requirements.

Comparison of worldwide lift safety standards —

Part 2:

Hydraulic lifts (elevators)

AMENDMENT 1: Reference to Japanese and Australian standards

1 Scope

The sole purpose of this amendment is to illustrate in the form of tabulations, the requirements specified in the Japanese and Australian standards applicable to lifts in relation to the requirements of standards covered in the Technical Report ISO/TR 11071-2:1996.

This Amendment does not constitute the general review of the ISO/TR 11071-2:1996.

The hydraulic lifts related requirements of the following standards are illustrated in this Amendment (see Annex B).

a) under heading "Australia":

- SA

b) under heading "Japan".

EUIL-MO Electrical Utilities Industry Law Ministerial Ordinance of Technical Standards for Electrical Equipment

BSLJ-EO Building Standard Law Enforcement Order Explanation of technical standard for elevators and escalators

NTF Notification of the Ministry of Construction

JIS Japanese Industrial Standard

JEAS Japan Elevator Association Standard

JEC Japanese Electrotechnical Committee

EAMCL Electrical Appliance and Material Control Law

JEM Standard of the Japanese Electrical Manufacturers Association

JEAC Japan Electrical Association Code

Note: For information on Japanese safety standards system applicable to lifts refer to Annex D of Amendment 1:1999 to ISO/TR 11071-1:1990, Comparison of worldwide lift and safety standards — Part 1: Electric lifts.

2 References and Terminology

For references, terminology, abbreviations, symbols and nomenclature refer to the Technical Report ISO/TR 11071-2:1996. Additional references are in the scope.

The following notations are used in the tabulations:

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 was not available at the time

	of publication of the report.
>	Greater than
<	Less than
≤	Up to (less or equal)

Rules on which entries in the tabulations for specific requirements are based are indicated in the brackets, either next to the entry or above a group of entries. To find a specific requirement one has to refer to the applicable CEN, ASME, or CSA standard listed in the introduction of this Amendment or to the Australian and Japanese standards listed in the scope of this Amendment.

In addition, tabulations make references to the following standards:

- ANSI/NFPA 70, National Electrical Code (USA)
- CSA C22.1, Canadian Electrical Code
- CSA B44.1/ASME A17.5, Standard for Elevator and Escalator Electrical Equipment
- CENELEC/IEC Standards
- AS 3000 Wiring Rules (Australia)
- AS 1979 Travelling Cables (Australia)

3 Basic assumptions

Amended tables of Section 3 of TR 11071-2.

TABLE 3.8.2
ASSUMPTION 6 (HORIZONTAL FORCES EXERTED BY A PERSON) AS APPLIED IN CURRENT STANDARDS

Assumptions	CEN	ASME	CSA	SA	Japan
1.0 Static force					
1.1 Landing doors	300 N (7.2.3)	5004 N [110.11e(7)]	2500 N (2.11.10.4.7)	1.2 kN (12.4.1 & 12.16.1)	No spec
1.2 Car enclosure	300 N (8.3.2.1)	334 N (204.1c)	330 N (3.6.1.3)	330 N (23.18)	No spec
2.0 Impact	No spec.	5004 N (110.11h)	5000 N (2.11.10.5)	No spec.	No spec
3.0 Force distribution	No spec.	No spec.	No spec.	No spec.	No spec

TABLE 3.9.2
ASSUMPTION 7 (RETARDATION) AS APPLIED IN CURRENT STANDARDS

Assumption	CEN	ASME	CSA	SA **	Japan
Maximum Average Retardation*					
•Progressive Safety Gear	1 g (9.8.4)	1 g (205.8b)	1 g (3.7.9.2)	2,295 g	1 g (JIS A4302)
•Progressive Clamping Device	1 g (9.9.4)	N/A	N/A	N/A	N/A
•Oil Buffers	1 g (10.4.3.2)	1 g (3.3.5.2)	1 g (3.3.5.2)	0,769 g	1 g [BSL-J-EO-129.9(9)]
•Rupture valve	1 g (12.5.5.1)	No spec.	No spec.	No spec.	N/A
•Plunger stops	1 g (12.2.3)	No spec.	No spec.	1 g (7.2.6)	No spec.
•Emergency speed limit	No spec.	1 g [305.2b(2)]	1 g (4.21.2.2.b)	No spec	No spec.
•Emergency car stops	No spec.	No. spec.	No spec.	No spec	No spec.
Maximum retardation					
•Safety gear	No spec.	No spec.	No spec.	No spec	No spec.
•Buffers (if $t = \text{Duration}$)	> 2,5 g (10.4.3.2) $t \leq 0,04$ s	> 2,5 g (201.4b) $t \leq 0,04$ s	> 2,5 g (3.3.5.2) $t \leq 0,04$ s	>2,5 g (9.1.5.3) $t \leq 0,04$ s	>2,5 g $t \leq 0,04$ s [BSLJ-EO-129.9(9)]

*Maximum average retardation levels exceeding 1 g can occur with a lightly loaded lift during safety or buffer application.

**Indirect lifts only

Note: 1 g = 9,81 m/s²
Approach to design safety for hydraulic components.
Amended tables of Section 4 of TR 11071-2.

4 Approach to design safety for hydraulic components

Amended tables of Section 4 of TR 11071-2.

Table 4.2.1.4: ILLUSTRATIVE EXAMPLES OF WALL THICKNESS FOR 4 MATERIALS

Source Country	Material	UTS MPa	0,2% PS MPa	Elong. %	Wall Thickness (mm)			
					CEN	ASME and CSA	SA	Japan
U.S.A.	ASTM A53-88a Grade A	330	205	>20	5,5	3,7	5,5	2.7
U.S.A.	ASTM A53-88a Grade B	415	240	>20	4,8	3,1	4,8	2.2
Finland	DIN 17100	510	353	22	3,6	2,2	3,6	1.8
Russia	35 GOST 1050	520	≥310	20	4,0	2,4	4,0	1.7

5 Driving machines and jacks (plungers and cylinders)

Amended tables of Section 5 of TR 11071-2.

Table 5.1.2
COMPARISON OF REQUIREMENTS FOR INDIRECT ACTING LIFTS

Requirement	CEN	ASME (303.1b)	CSA	SA	Japan
Driving machine (jack) to be vertical	No spec	Yes	No spec.	No spec.	No spec.
Minimum number of ropes per jack	2(9.1.3)	2	2(4.23.1.2)	2	2
Maximum roping ratio	No spec.	1:2	1:2(4.18.1)	No spec.	No spec.
Moving element of ram to be guided	Yes(12.2.2.4)	No spec.	No spec.	No spec.	No spec.
Slack rope device required	Yes(9.4.1b)	Yes	No spec.	Yes	Yes
Safety factor for - ropes	12(9.2.2)	6,65—11,9(212.3)	6,65—11,9 (3.14.3)	10	10
- chains	10(9.2.5)	not permitted	Not permitted	Not permitted	10
Maximum rated speed	No limit*	No limit	No limit	1 m/s	No limit

*EN81/2 specifies requirements for lifts with rated speed up to 1,0 m/s only. For lifts with higher rated speeds, additional measures have to be taken which are not specified in the Standard.

6 Valves, piping and fittings

Amended tables of Section 6 of TR 11071-2.

Table 6.1.1 (Part 1 of 2)
PIPES AND FITTINGS – COMPARISON OF REQUIREMENTS

Requirement	CEN	ASME	CSA	SA	Japan
(1) Pipes in general	(12.3.1)	(303.1)	(4.19.1)	(7.4.1)	(NTF-1675-'82)
(a) suited to used fluid	Yes	Flexible hose only (303.3c)	[4.19.1.4.1(c)]	No	No Spec.
(b) installed as to avoid stress	Yes	Yes (303.2c)	Yes (4.19.1.3)	Yes (7.4.1.3)	Yes
(c) protected against damage	Yes	No spec.	No spec.	Yes (7.4.1.3)	Yes
(d) accessible for inspection	Yes	Grooved pipe fittings only	No spec.	Yes only (7.4.2.2)	Yes (JEAS-B205)
(e) if through floor or walls, then protected and capable of being dismantled for inspection	Yes	No spec	No spec.	No	Yes (JEAS-B205)
(f) grooved pipe fittings, additional	No spec.	303.3b	No spec.	No	No Spec.
(1) installed per manuf. spec.		Yes			
(2) will not permit separation if sealing fails		Yes			
(3) devices for (2) removable with special tools, not with quick release levers or toggles		Yes			
(g) Buried piping below ground to be protected from corrosion (see 5.1.6.2 of this report)	Not permitted (12.3.1.2)	Yes (303.5)	No spec.	No	No Spec.
(h) Threading of pipes permitted	No spec.	Only schedule 40 and greater (303.2b)	As ASME (4.19.3.2.3)	Yes (7.4.3)	No Spec.
(i) Specific requirements for welding	No spec.	Yes (303.6)	Yes (4.19.4)	No spec.	No Spec.

Table 6.1.1 (Part 2 of 2)
PIPES AND FITTINGS – COMPARISON OF REQUIREMENTS

Requirement	CEN	ASME	CSA	SA	Japan
(2) Rigid pipe and fittings	(12.3.2)	(303.2, 1302.4)	(4.19.3, 4.19.3.2)	(7.4.2)	(NTF-1675-'82)
(a) between cylinder and non-return or down valve	Yes	supply piping	pressure piping	Figure 7.5.5	
(1) design pressure	3,3 x full load pressure			Table 7.4(5)	
(2) design formula (per section 4.1.4 of this report)	Formula (2) *+1,0 or 0,5 mm			Table 7.4	
(b) between rupture and non-return or down valve	Calculated with additional FOS=1,3 if used to synchronize telescopic jacks with 2 or more stages			Table 7.4(5)	
(c) between cylinder and rupture valve	Calculated with cylinder pressure			Table 7.2	
(3) Flexible hoses and fittings, if between cylinder and non-return or down valve	(12.3.3)	(303.3c)	(4.19.1.4)	(7.2.3.2)	(JEAS-708) (JIS-B8360)
(a) factor of safety	8 (flexible hose only)	10	10	Table 7.4	10
(b) pressure required to withstand in test	5 x full load pressure	5 x working pressure	5 x working pressure		4x working pressure
(c) hoses marked with:					
(1) trade mark	Yes	No spec.	Yes	No	Yes
(2) test pressure	Yes	Yes	Yes		No Spec.
(3) date of test	Yes	Yes	Yes		No Spec.
(4) replacement date	No specification	Yes, no longer than 6 yrs	No specification		No Spec.
(d) bending	Per manufacturer's instructions	Per SAE standard	Per SAE standard	Yes (7.4.3.1)	Yes
(e) installation in hoistway through walls	Yes (12.3.1.2)	Not permitted	Not permitted	Yes (7.4.3.2)	Not permitted
(f) fittings of non-reusable type only	No spec.	Yes (303.3c(2))	Yes	(7.4.3.1) AS 8791	No Spec.

*Formula (2) in TR 11071-2.

Table 6.1.2 (Part 1 of 3)
VALVES – COMPARISON OF REQUIREMENTS

Requirement	CEN	ASME	CSA	SA	Japan
(1) Shutoff valve	[12.5.1]	[303.4a]	[4.19.2.4]		No spec.
(a) where required	Every lift	Where cylinder is not exposed to inspection	Every lift	Not required	
(b) location	Between cylinder & non-return valve; in machine room	In supply line to cylinder; in machine room	Between pump and jack; next to pump		
(c) manually operated	No spec.	Yes	Yes		
(2) Non-return (check) valve	[12.5.2]	[303.4c]	[4.19.2.2]	[7.5.3]	Yes [5(2)]
(a) location	Between pump & shutoff valve	No spec.	No spec.	No spec.	No spec.
(b) capable of holding rated load when:					
(1) pressure drops below min. oper. pressure; or	Yes	Yes	No spec.	Yes	No spec.
(2) pump stops	No spec.	Yes	Yes	Yes	Yes
(c) activated by pressure from jack and at least one guided compression spring and/or gravity	Yes	No spec.	No spec.	No spec.	No spec.
(3) Pressure (pump) relief valve	[12.5.3]	[303.4b]	[4.19.2]	[7.5.2.1]	Yes [5(1)]
(a) location	Between pump & non-return valve	Between pump & check valve	As ASME	between pump and check valve	between pump and check valve
(b) valve cannot be shutoff from hydraulic system	No spec.	Yes	Yes	Yes (7.5.2.2)	Yes
(c) fluid to be returned to tank	Yes	No spec.	No spec.	Yes	No spec.
(d) Setting	—	Pre set to open at pressure $\leq$ 125% WP	As ASME	125% (7.5.3)	Pre-set to open at $P \leq 125\%$ WP
(e) requirements for operation (Note: see 2.3 in this report for relationship between FLP and WP)	Adjusted to limit pressure to 140% FLP or up to 170% FLP (if high internal losses), but in that case, all hydraulic equip. including jack and buckling to be calculated at $170/140 \times$ FLP	Of a size to limit pressure 20% above that in (d), or maximum of 150% WP	As ASME	No spec. 125% and full load working pressure	Max of 150% WP
(f) sealing	No spec.	If adjustable, must be sealed	Must be sealed	Yes if not on pump in tank	No spec.
(g) exceptions for centrifugal pump	No spec.	Yes	Yes	Yes	No spec.

(Continued)

Table 6.1.2 (Part 2 of 3)
VALVES – COMPARISON OF REQUIREMENTS

Requirement	CEN	ASME	CSA	SA	Japan
(4) Direction valves	[12.5.4]	[306.9]	[4.22.9]	[7.5.8]	No spec.
(a) hold open electrically	Yes	Yes	Yes	Yes	No spec.
(b) down direction valve activation	By pressure from jack and at least one guided compression spring per valve	See (d)	As ASME	Yes by at least on guided compression spring	No spec.
(c) up direction valve activation	Special requirements if only one contactor used to interrupt power to motor, in that case the by-pass valve must be used	See (d)	As ASME	No spec.	No spec.
(d) springs activating electrically operated valves	See (b)	Must be of compression type	As ASME	No spec.	No spec.
(5) Rupture valve	[12.5.5]	[410.6] (seismic risk zone 2 or higher only)	[4.19.1.4.1]	[7.5.5]	No spec.
(a) To be used as one of the methods of protection against excessive speed	Yes, per 9.5 of CEN		Yes, only if flexible hoses used	Yes for all lifts	No spec.
(b) Requirements for stopping car	Rated speed + 0,3 m/s with $\leq g$	No spec.	No spec.	Close to allow car to sink at min. 0,02 m/s max. 0,05 m/s	No spec.
(c) Accessible for inspection and adjustment	Yes	No spec.	No spec.	No spec	No spec.
(d) be integral to cylinder, or directly or close to cylinder	Yes	Yes	Yes	Yes	No spec.
(e) Special requirements for lifts with several jacks	If jacks oper. in parallel, only one required; otherwise, must be interconnected	No spec.	No spec.	Yes	No spec.

Table 6.1.2 (Part 3 of 3)
VALVES – COMPARISON OF REQUIREMENTS

Requirement	CEN	ASME	CSA	SA	Japan
(6) Manual lowering valve	[12.9.1]	[303.4d]	[4.19.2.3]	[7.5.6]	No spec.
(a) location	In machine room	On or adjacent to control (up and down) valve	On power unit	In machine room	No spec.
(b) must be identified	Yes [15.15]	Yes	Yes	Yes	No spec.
(c) operated by continuous manual force and protected against involuntary action	Yes	No spec.	No spec.	Yes Between 0.05 and 0.2 m/s	No spec.
(d) maximum speed	0,3 m/s	0,10 m/s	0,25 m/s	0,2 m/s	No spec.
(e) additional requirements for indirect plunger elevators	Not openable when pressure is below minimum operating pressure	See (7)	See (7)	Yes	No spec.
(7) low pressure switch	No spec	[306.14] Must be installed if cylinder top is above top of storage tank to prevent operation of lowering valve should pressure drop	[4.22.13] Same as ASME	No spec	No spec.
(8) Over pressure switch on telescopic jacks to prevent operation if full load pressure exceeded by 20%.	[12.2.5.5] Yes	No spec.	No spec.	No spec	No spec.
(9) Restrictor A method of protection against excessive speed	[12.5.6] Yes	No spec.	No spec.	Flow. Restrictor Yes (7.5.5)	No spec.

7 Ropes and chains

Amended tables of Section 7 of TR 11071-2.

Table 7.1: SUSPENSION ROPES AND CHAINS

Requirement	CEN	ASME	CSA	SA	Japan
SUSPENSION ROPES ON HYDRAULIC LIFTS (and electric lifts, where marked*)					
1. Minimum number of ropes:					
a) On hydraulic lifts					
• On indirect acting lifts	2(9.1.3a)	2 (302.lb)	2 (4.24.1)	2	2
• Per jack (machine)	yes	yes	No spec.	Yes	No spec.
• Between car and counterweight	2(9.1.3b)	2 (307.1)	2(4.23.1)	2	No spec.
b) On electric lifts*					
• Traction lifts*	2(EN81—1)*	3 (212.4)*	3 (3.14.4.1)*	3	3
• Drum lifts*	2(EN81—1)*	2 (212.4)*	2(3.14.4.1)*	2	2
2. Minimum rope diameter	8,0 mm(9.1.2)	9,5 mm (212.4)	9,5 mm (3.14.4.4)	8,0 (Table 17.1)	12 mm
3. Minimum outer wire diameter	No spec	0,61 mm (212.4)	0,56 mm (3.14.4.4)	No spec	No spec.
4. Minimum sheave/rope ratio	40(9.2.1)	40 (208.2)	40 (3.10.2.1)	40	40
5. Minimum factor of safety for ropes					
a) On hydraulic lifts					
• suspension ropes	12(9.2.2)	same as electric (302.lb)	same as electric (4.24.1.2)	12 for 8 mm dia. ropes 10 for 9.5 mm dia. rope (Table 17.1 in AS1735 part 3.)	10
• counterweight ropes	No spec.	7(307.1)	7(4.23.1.2)	Same as above	10
b) On electric lifts* (passenger lifts only for ASME & CSA)	16 with 2 ropes* 12 with 3+ ropes* 12 for drum* (EN81:1)	7,6-11,9* Increases with rope speed (212.3)	7,6-11,9* Increases with rope speed (3.14.3)	10 to 11.9 depending on speed (Table 17.5 in AS1735 part 2.)	10
SUSPENSION CHAINS ON HYDRAULIC LIFTS					
6. Minimum number of chains					
• per jack	2 (9.1.3a)	Not permitted	Not permitted (3.14.1)	Not permitted	2
• between car and counterweight	2 (9.1.3b)	(212.1)			2
7. Type of chains	steel parallel link or roller type (9.1.1)	N/A	N/A	N/A	JIS B1801-1980 roller type
8. Minimum factor of safety for chains	10 (9.2.5)	N/A	N/A	N/A	10

*This data is applicable to Electric Lifts.

8 Capacity and loading

Note: No data is available for amending Tables in Section 8 of TR 11071-2.

9 Spaces and clearances

Note: For amended tables the Annex A, Table A1 in this Amendment.

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10 Protection against, free-fall, excessive speed and creeping

Amended Table 10.1.2 of TR 11071-2.

Table 10.1.2
Protection against Free Fall, Excessive Speed and Creeping

Column A: Assumed Safety Hazards						Column B: Hazards in Column A may be caused by the following anticipated failures:		
HAZARDS	CEN	ASME	CSA	SA	Japan	FAILURES	CEN	ASME
1. Car free fall on:								
1.1 Direct acting lifts	No (Table 2)	No (301.8)	No (4.16.1c)	No	No spec.	1.1.1 Rupture of jack	No	No
1.2 Indirect-acting lifts	Yes (Table 2)	Yes (301.8)	Yes (4.16.1c)	Yes (Table 35(A))	Yes (NTF-1675-'82)	1.2.1 Suspension failure	Yes (9.8.1.2)	Yes (301.8)
2. Car descent with excessive speed								
2.1 Direct-acting lifts	Yes (9.5.1)	Yes* (24.10.6)	Yes** (4.19.1.4.1f)	Yes (Table 35(A))	No spec.	2.1 Rupture in hydraulic system (jack excluded)	Yes	Yes*
2.2 Indirect-acting lifts	Yes (9.5.1)	Yes* (24.10.6)	Yes** (4.19.1.4.1f)	Yes (Table 35(A))	Yes (NTF-1675-'82)			
3. Creeping from a landing	Yes	Yes	Yes	Yes (Table 35(A))	Yes	3.1 small leakage in hydraulic system including jack	Yes	Yes
By more than	120 mm (9.5.1)	25 mm (306.3)	25 mm (4.22.3.2)	150 mm (34.1)	75 mm (NTF-1675-'82)			

Column B Continued:			Column C: Standards mention the following methods of protection against hazards in A as acceptable:					
CSA	S A	JAPAN	METHODS	CEN	ASME	CSA	S A	JAPAN
No	No	No spec.	Not applicable	-	-	-	-	(NTF-1675-'82)
Yes (4.16.1c)	Yes (Table 35(A))	Yes (NTF-1675-'82)	1.2a Safety gear and governor	Yes (9.8 & 9.10.2)	Yes (301.8 & 205.7)	Yes (4.16.1c & 3.7.7)	Yes (Table 35(A))	Yes
			1.2b Safety gear and tripping by suspension failure	Yes (9.8 & 9.10.3)	No (205.7a, 301.8)	No (3.7.7.1)	Yes	Yes
			1.2c Safety gear and safety rope	Yes (9.8 & 9.10.4)	No (205.7a, 301.8)	No (3.7.7.1)	Yes	No
			1.2d Safety gear inertia operated				Yes	
Yes**	Yes (Table 35(A))	No Spec.	2.a Safety gear & governor	Yes (9.8 & 9.10.2)	Yes* (24.10.4)	No	Yes (Table 35(A))	Yes
			2.b Rupture valve (or safety valve)	Yes (12.5.5)	Yes* (24.10.6)	Yes** (4.19.1.4.1f)	Yes (7.5.5)	No
			2.c Restrictor	Yes (12.5.6)	No	No	No	No
Yes	Yes (Table 35(A))	Yes (NTF-1675-'82)	3.a Safety gear & tripping by downward movement	Yes (9.8 & 9.10.5)	No	No	No	No
			3.b Clamping device & tripping by downward movement	Yes (9.9 & 9.10.5)	No	No	No	No
			3.c Pawl device	Yes (9.11)	No	No	Yes (9.5)	No
			3.d Electric anti-creep system	Yes (14.2.1.5)	Yes (306.3)	Yes (4.22.3)	Yes (31.4)	Yes
			3.e Door lock valve				Yes (7.5.4)	

Column A: Assumed Safety Hazards						Column B: Hazards in Column A may be caused by the following anticipated failures:		
HAZARDS	CEN	ASME	CSA	SA	JAPAN	FAILURES	CEN	ASME
4. Counterweight free-fall if spaces underneath are accessible	Yes (9.6.1)	Yes (300.10b)	Yes (4.7.3)	Yes	No spec.	4.1 CWT suspension failure	Yes (5.5.2b)	Yes (301.9)
						4.2 CWT path obstructed resulting in slackening of CWT suspension	No	Yes (301.9)

Notes:* Only on lifts in seismic zone 2 or greater.

**Only on lifts employing flexible hoses and fittings.

Column B Continued:			Column C: Standards mention the following methods of protection against hazards in A as acceptable:					
CSA	SA	JAPAN	METHODS	CEN	ASME	CSA	SA	JAPAN
Yes (4.16.2)	Yes	No spec.	4.a CWT safety gear combined with:	Yes (9.6.2)	Yes (301.9)	Yes (4.16.2)	Yes	No spec.
			(i) Governor,	Yes (9.6.2.1)	No	No	Yes	
			(ii) Tripping by suspension failure,	Yes (9.6.2.2)	Yes (301.9)	Yes (4.16.2)	Yes	
			(iii) Safety rope	Yes (9.6.2.3)	No	No	Yes (33.2)	
Yes (4.16.2)	Yes (34(d))	No spec.	4.b CWT safety gear & tripping by slackening of ropes	No	Yes (301.9)	Yes (4.16.2)	Yes (34(d))	No spec.

11 Electrical devices

Note: For amended tables see Annex A, Table A2.

Annex A—Table A1 (Part 1 of 5)
SPACES AND CLEARANCES
 (Related to Section 9 of TR 11071—Part 2)

REQUIREMENT	CEN	ASME	CSA	JAPAN	SA
1. Top car clearances (with ram in its ultimate position)	[5.7.1]	[300.8d & e]	[4.5.5]	NTF-1675-82	[8.1.4]
1.1 Guided travel of car (m) Min.	$0,1+0,035V_m^2$	$>0[200,8]$	$>0[3.2.8]$	No spec.	0,1m [8.1.3]
1.2 Free height above a specific area of the car roof (m) Min.	$1+0,035V_m^2$ in area in item 3.3	1,07 in area in item 3.1	0,6 in area in item 3.1	} $0,6+0,051V_m^2$ NTF-1675-82	0,9m
1.3 Well roof to car crosshead (m) Min.	$0,3+0,035V_m^2$	0,15	0,60		
1.4 Well roof to highest equipment on car top (except items in 1.5) (m) Min.	same as 1.3	0,15	0,15	No spec.	0,38m–0,76 m 0,45m (8.1.4(f), 8.2.4(l))
1.5 Well roof to guide shoes, rope attachments, door header of vert. sliding doors (m) Min.	$0,1+0,035V_m^2$	No spec.	$>0[4.5.6]$	No spec.	0,15m to Guide Shoes
1.6 Well roof to ram-head assembly (m) Min.	0,1 Yes	No spec. Not applicable	No spec. Not applicable	No spec. N/A	0,23m No spec. Not applicable
2. Top counterweight clearance (with car on compressed buffers)	[5.7.1.2]	[300.8f]	[4.5.8]	No spec.	[8.1.6] [8.2.6]
2.1 Guided travel of counterweight (m) Min.	$0,1+0,035V_d^2$	$>0[300.8f]$	$>0[4.5.8]$	No spec.	-
2.2 Well roof to counterweight Min.	No spec.	152mm	150mm	No spec.	150mm
3. Refuge space on car top	[5.7.1.1(d)]	[300.8g]	[4.5.9]	JIS A 4302 4.2.3(3)	[8.1.4] [8.1.5]
3.1 Minimum area (m ²)	0,12 (8.13.lb)	0,42	—	No spec.	0,342
3.2 Minimum height (m)	$1 + 0,035V_m^2$	1,07	0,6	1,2	0,9
3.3 Minimum block (m ³)	$0,5 \times 0,6 \times 0,8$	—	$1,07 \times 0,76 \times 0,6$	No spec.	No spec.

Notes: * Factor 0,035 in CEN column represents 1/2 gravity stop distance with 115% rated speed. This value need not be taken into account for DIRECT-ACTING lifts
 V_m = rated speed upwards (m/s) V_d = rated speed downwards (m/s)

Annex A—Table A1 (Part 2 of 5)
SPACES AND CLEARANCES
 (Related to Section 9 of TR 11071—Part 2)

REQUIREMENT	CEN	ASME	CSA	JAPAN	SA	
4. Runby of car & counterweight		[300.8b, c & f]	[4.5.2 & 4.5.4 & 4.5.8]	JIS A 4302 4.2.4(1)	Direct acting	Indirect acting
4.1 Bottom car runby					[8.1.2]	[8.2.2]
for down operating speed	No spec.	76mm	75mm	70mm	25mm	230mm
0<0.51m/s Min.		152mm	75 x speed/0.50 mm	150mm	50mm	230mm
1.0>0.51m/s Min.			150mm	150mm	50mm	230mm
>1.0m/s Min.		152mm	600mm	600mm	230mm or 600mm if land door self closing	
for any speed Max.		610mm			[8.1.3]	[8.2.5]
4.2 Top car runby	No spec.	76mm	75mm	No spec.	100mm w/o hyd cush.	-
for up rated speed					75mm w hyd cush.	-
0>0.51m/s Min.		152mm	150 x v _m * mm *see item 1 note		150mm w/o hyd cush.	
1.0>0.51m/s Min.					100mm w hyd cush.	
>1.0m/s Min.		152mm	150mm		N/A	N/A
for any speed Max.		610mm	600mm		N/A	N/A
4.3 Bottom COUNTERWEIGHT runby = distance car travels above top landing until plunger stops plus the following Min.	No spec.	152mm	150mm	No spec.	150mm	plus rope stretch
5. Pit clearances						
- With car on fully compressed buffers:						
5.1 Pit floor and the lowest portion of car structure (except items in 5.2) Min.	[5.7.2.3]	[303.8a]	[4.5.1]	No spec.	8.1.1.2/3 & 8.2.1.2/3	
5.2a Pit floor to guideshoes or rollers, safety gear blocks, pawl device, toe guards, vertical car door Min.	0,5m (except item 5.2a)	0,61m (except item 5.2b)	0,6m (except item 5.2b)		0,6m	
	0,1m	>0	>0		50 mm	

Annex A—Table A1 (Part 3 of 5)
SPACES AND CLEARANCES
 (Related to Section 9 of TR11071-Part 2)

REQUIREMENT	CEN	ASME	CSA	JAPAN	SA
5.2b Any equipment on car if located within Xmm from any side of car platform, and any equipment on car or travelling with car and any equipment mounted in pit within Zmm horizontally from either side of the car frame centre-line parallel to guiderails, clearance to pit floor or to car structure.	see items 5.2a, 5.3 & 5.5	X = 305mm Z = 305 mm clear >0	X* = 150mm Z = 75 mm clear >0 * In CSA applicable to pipes and car bracing only.		300mm
5.3 Parts in pit, e.g. jack supports, pipes, fittings to car (except items in 5.2) Min.	0,3m	>0	No spec.		0,45m to u/s if car platform, except 0,3m to u/s of car underbeams and buffer striker plates
5.4 On inverted jacks, pit floor (or equipment in pit) to down travelling ram-head . Min. except, if the space is screened . . Min.	0,5m 0,1m	see item 5.2b No other spec.	No spec.		No spec. No spec.
5.5 On direct acting telescopic jack lifts, pit floor to lowest guiding yoke of the jack Min.	0,5m	see items 5.1 & 5.2b	No spec.	No	Item 5.1 applies 600mm
5.6 Sufficient space for a rectangular block or refuge space (m ³)	0,5 X 0,6 X 1,0 resting on any face	0,61 X 1,22 X (H)0,61 or 0,457 X 0,917 X (H) 1,066			2 x 1,37 x (H) 0,6 or 0,45 x 0,6 x (H) 1,2
-With car at its upmost position (with fully compressed cushioned stop of jack)	[5.7.2.4]	[200.8]	[3.2.8]		900 mm (8.1.4)
5.7 Guided travel (m) of counterweight . Min. where, v _m = rated speed upwards	0,1+0,035v _m ²	>0	>0		900 mm (8.2.4)
6. Well to car-entrance-side clearances					
6.1 Car without car doors	[11.3 & 5.4.4] see rules in CEN	[204.4a] Not permitted	[3.6.4.1] Not permitted	BSLJ-EO 129 5(3) Not permitted	Section 24 AS 1735.3 and 1735.2-1993 Not permitted
6.2 Car with car doors	[5.4.3 & 11.2]	[108.1e & d]	[2.9.4 & 2.9.5]	BSLJ-EO 129 6(4)	15.1 of AS 1735.3 and 15.1.2.1 of AS 1735.2-1993

Annex A—Table A1 (Part 4 of 5)
SPACES AND CLEARANCES
 (Related to Section 9 of TR 11071—Part 2)

REQUIREMENT	CEN	ASME	CSA	JAPAN	SA
6.2.1 Car sill to landing sill Min. Max.	No spec. 35mm	13mm or 19*mm 38mm *Corner car guides	13mm or 19*mm 38mm *Corner car guides	No spec. 40mm	13mm or 20*mm 40mm *Corner car guides
6.2.2 Car sill to inner well face	150mm 200mm Not limited	127mm 190mm No spec.	125mm 190mm Not limited	BSJL-EO 129-6(4) 125mm No spec. No spec.	[15.2(a)(b)] 75mm passenger; 150mm freight 150mm Not applicable Not applicable
a) limited to Max.	200mm through height max	No spec.	No spec.	No spec.	
b) except for vertical sliding doors to Max.	500mm				
c) except if car door lock provided Max.					
d) specific case Max.					
6.2.3 Car door panel to landing door panel Max.	120mm [11.2.3]	140mm [204.4e]	140mm [3.6.4.3]	No spec.	150mm [15.1.5]
-swinging landing door + car gate Max.	No spec.	102mm	100mm	No spec.	150mm [15.1.5]
-swinging landing door on freight elevator Max.	No spec.	No spec'd max. but permitted	165mm	No spec.	150mm [15.1.5]
7. Other horizontal well clearances	[11.4 & 5.6.2]	[108.1a, b, c]	[2.9.1/2/3]		[15.2(a),(b),(d)]
7.1 Car to well enclosure (except sides covered in 6) Min.	No spec.	19mm	20mm	No spec.	20mm
7.2 Car to counterweight Min.	50mm	25mm	25mm	No spec.	25mm
7.3 Counterweight to cw guard or to well enclosure Min.	No spec.	19mm	20mm	—	25mm to guard
7.4 Car to cw guard Min.	No spec.	No spec.	13mm or 20*mm *corner car guides	No spec.	20mm
7.5 Car to car in multiple wells Min.	300mm (without partition)	51mm	150mm	No spec.	100mm
8. Clearances in machine room (MR) & machinery spaces (MS)					
8.1 Clearances around electrical equipment (panel or cabinet)	[6.3.2/6.4.2.2]	[306.6(a), ANSI/NFPA 70: 620-72 & 110-16] (Note 2)	[4.22.6.1, CSA C22.1 Sec 38-044] (Note 2)	NTF-1675-'82	26.14 AS 1735.2-1993
8.1.1 In front					
a) Depth Min.	0,7m	0,9m [0-150v]	0,75m	0,5m	0,6m
b) Width Min.	0,5m (Note 1)	0,9-1,2m [151-600v]	0,46m	No spec.	0,45m
8.1.2 At rear if openable Min.	No spec.	same as front	0,6m	same as front	0,6m

Note 1: 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 cabinet or 0.5m, whichever is greater.

Note 2: Line 8.1: ASME—Rule 306.6(a) requires compliance with the National Electrical Code (ANSI/NFPA 70).
 CSA—Clause 4.22.6.1 requires compliance with the Canadian Electrical Code (CSA—C22.1).

Annex A—Table A1 (Part 5 of 5)
SPACES AND CLEARANCES
 (Related to Section 9 of TR 11071—Part 2)

REQUIREMENT	CEN	ASME	CSA	JAPAN	SA
8.2 Clearance near parts requiring maintenance & inspection of moving parts					
a) Clearance Min.	0,5 x 0,6m	same as 8.1 (only electrical parts)	0,45m [4.1.2.1, 2.3.7]	0,5m	0,6m [5.1]
b) Accessway width to those areas Min.	0,5m	No spec.	0,45m	0,5m	0,6m [5.1]
c) Accessway width if no moving parts Min.	0,4m	No spec.	0,45m	0,5m	0,38m [5.1]
8.3 Clear headroom in MR & MS Min.	1,8m	2,13m [300.2, 101.4]	2.13m [4.1.2.1, 2.3.4]	2,0m NTF-1675-'82	2,00m
Exceptions for pulley rooms Min.	1,5m	1,07m	1,07m	No spec.	• if governor: 2m or 1.5m to beam • if no governor: 1,7m or 1,4m to beam
8.4 Clear vertical distance above rotating part Min.	0,3m	No spec.	No spec.	No spec.	0,38 m
8.5 If difference in MR floor levels exceeds this height, stairs or ladders and guard rails must be provided Min.	0,5m [6.3.2.4]	0,38m [300.1, 100.3f]	0,4m [4.1.1, 2.2.3.6]	0,23m [BSLJ-EO 129-8(5)]	Differences shall be avoided (0.3m) 1735.2, Section 5, Clause 5.11
8.6 Machine room door					
-width Min.	0,6m	0,76m [300.2, 101.3d]	0,75m [4.1.2.1, 2.3.3.5]	0,7 m [BSLJ-EO 129-8(4)]	0,6m
-height Min.	1,8m	1,83m	2,03m		2,0m
8.7 Machine room access trap door Min.	0,8 x 0,8m [6.3.3.2]	Prohibited	Prohibited [4.1.2.1, 2.3.3.2c]	Prohibited	Prohibited
8.8 Pulley room access trap door Min.	same as 8.7 [6.4.3.2]	762 x 762mm [300.2, 101.3d(1)(a)]	705 x 750mm [4.1.2.1, 2.3.3.5.1b]	No spec.	Prohibited

Annex A—Table A2 (Part 1 of 9)
ELECTRICAL DEVICES
 (Related to Section 11 of TR 11071—Part 2)

No.	REQUIREMENT	CEN	ASME	CSA	JAPAN	SA
1	Check on closed position of —well auxiliary doors/traps (A) —pit access door (A) —access opening on observation lifts (A)	Yes (5.2.2.2.2) Yes (5.7.2.2) openings not required	Yes [300.11, 110.1(e)] No [300.7, 106.1d(4)] openings not required	Yes [4.8, 2.11.1(f), 3.12.2.24] In special cases Yes (4.8, 2.11.1.3)	Yes [BSLJ-EO 129-9.1(1)] Yes [BSLJ-EO 129-9.1(1)] Yes [BSLJ-EO 129-9.1(1)]	Yes [P2-12.24(g)] Yes [P2-10.6(c)] Openings not permitted
2	Check on locking of car doors (A) required cases specified in this rule:	Yes (5.4.3.2.2) (5.4.3.2)	No —	Yes (4.15, 3.6.4.2.4) (4.15, 3.6.4.2.2)	No spec.	No —
3	Landing/car door automatic reopening device (D) —horizontal sliding —always required —if kinetic energy above this limit —vertically sliding landing and car doors if automatic or momentary pressure operation	Yes (7.5.2.1.1.3) 4J (8.7.2.1.1.3) Not permitted (7.5.2.2 and 8.7.2.2) Yes (7.7.3.1)	No Yes 3.3J (300.13, 112.5) Yes (300.13, 112.3d3) Yes (306.4(b)(3), 210.2p and 111.3) Yes (306.4(b)(3), 210.2p and 111.7)	No Yes 3.5J (4.10, 2.13.5) Yes (4.10, 2.13.3, 4.2c) Yes (4.22.4.3(c), 3.12.2.17, 2.12.2) Yes (4.22.4.3(c), 3.12.2.17, 2.12.7)	No spec. No spec. No spec.	Yes [P2-25.6] 3.4J Yes [P25.7, 25.8] Yes [P2-13.2] Yes [14]
4	Check on locking of landing doors (A)	Yes (7.7.4)	Yes (306.4(b)(3), 210.2p and 111.3)	Yes (4.22.4.3(c), 3.12.2.17, 2.12.2)	Yes [BSLJ-EO 129-9.1(2)]	Yes [P2-13.2]
5	Check on landing doors closed as part of #4 or separate (A)	Yes (7.7.4)	Yes (306.4(b)(3), 210.2p and 111.7)	Yes (4.22.4.3(c), 3.12.2.17, 2.12.7)	Yes [BSLJ-EO 129-9.1(2)]	Yes [14]
6	Check on closed position of landing door panels which are not locked (A) —if panels directly mechanically related —if panels indirectly related only by ropes	No (7.7.6.1) Yes (7.7.6.2)	No [300.12, 111.3b 4a] No [300.11, 110.11 g]	No [4.9, 2.12.2.1.4a] No [4.9, 2.12.2.1.4]	No spec. No spec.	No Yes
8	Switches to override #4 to #6	Not permitted	Yes (300.12, 111.9c)	Yes (4.9, 2.12.9.3)	Not permitted [BSLJ-EO 129-9.1(1)]	—
8.1	Hoistway access switch, overriding #4 to #6(A)	Not permitted	Yes (300.12, 111.9c)	Yes (4.9, 2.12.9.3)	Not permitted [BSLJ-EO 129-9.1(1)]	—
8.2	Car and landing door bypass switches in machine room, overriding #4 to #6	Not permitted	Not required	Yes (4.22.2, 3.12.1.4)	Not permitted [BSLJ-EO 129-9.1(1)]	—
8.3	Check on failure or override of #4 to #6	Not permitted	Not required	Yes (4.22.1, 3.12.1.5)	Not permitted [BSLJ-EO 129-9.1(1)]	Yes [P2-13.1]
9	Check on retracted position of hinged or moveable car sills	—	Yes [306.4(b)(5), 210.2u and 203.16]	Yes [4.22.4.3(e), 3.12.2.22, 3.5.16]	No spec.	—
10	Photocells required for doorless cars, if such cars permitted (D)	Yes (8.8)	Not permitted	Not permitted	Not permitted [BSLJ-EO 129-9.1(1)]	Not permitted
11	Check on closed position of car door (A)	Yes (8.9.2)	Yes [306.4(b)(4), 210.2q and 204.4b]	Yes [4.22.4.3(d), 3.12.2.18 and 26, 3.6.4.2]	Yes [BSLJ-EO 129-9.1(1)]	Yes [P2-24.3]

Note: Symbols (A), (B) and (D) used in column "Requirement" throughout Table A2 mean:

(A) Electric safety device in the form of safety contacts (switches) (see 2.4 in TR 11071—Part 2)

(B) Electric safety device in the form of safety circuit (see 2.4 in TR 11071—Part 2 re electrical "safety" versus "protective" device).

(D) Protective device other than electric safety (CEN term) or electrical protective (ASME/CSA term) device.

Annex A—Table A2 (Part 2 of 9)
ELECTRICAL DEVICES
 (Related to Section 11 of TR 11071—Part 2)

No.	REQUIREMENT	CEN	ASME	CSA	JAPAN	SA
12	Check on locking or closing of car —top emergency traps (A) —side emergency doors —panels of observation elevator car	locking (8.12.5.2) locking (8.12.5.2) — —	No [204.1e] Closing [306.4(a)(3), 210.2s and 204.2d3g] —	Closing [4.22.4.2(f), 3.12.2.20, 3.6.1.5d] Closing [4.22.4.2(d), 3.12.2.19, 3.6.2.4.2g] Locking [4.15, 3.6.2.5e]	Locking BSLJ EO 129-5(4) Locking —	Yes [P2-23, 14(f)] Not permitted —
13	Check on extension of 2 suspension ropes or chains, if permitted (A)	Yes (9.3.3)	No	No	No spec.	No
15*	Check on the operation of car safety gear (A) —To prevent restart downwards	Yes (9.8.8)	Yes [306.4(a)(4), 210.2i, 205.7, 206.4a, c] No [301.8a]	Yes [4.22.4.2(e), 4.16.1a, 3.12.2.11] No	No spec. No spec.	Yes Yes [P2-33.7, 1]
16	Check on the car overspeed by —a device on governor or other device —a device of type (A) or (B)	Both (9.10.2.10.1) Both	governor [306.4(a)(5), 210.2(j)] A only	No spec. No spec.	NTF-1675-82, Direct: No Indirect: governor (S:45 m/min) other device (S<45 m/min) No spec.	Governor [34(b)] (A) only
17	Check on non-automatic resetting of governor (A)	Yes (9.10.2.10.2)	by manual reset [306.4(a)(5), 210.2(j), 206.4c]	No spec.	Yes [BSLJ-EO 129-9.1 (5)]	By manual reset [P2-34.3.2]
18	Check on tension in the governor rope (A)	Yes (9.10.2.10.3)	Yes (206.7) jawless only	No spec.	No spec.	Yes [34(c)(ii)] jawless only
19	Check on buffer return to normal position —pit buffers of energy dissipation type —type C safety buffers	Yes (10.4.3.3) Yes (9.8.6.2)	Yes [301.3, 201.4e3] Gas return only Yes [301.8, 205.8b7]	No Yes [4.16.1, 3.7.8.2a]	No spec. No spec.	No Yes [9.5(iii)]
20*	Check for slack rope (or chain) on indirect acting lifts (A)	Yes (10.6)	Yes [306.4(a)(6), 302.1b]	No	Yes [NTF-1675-82]	Yes [P2-30.7]
22*	Stopping of the machine and checking its stopped condition (A) or (B) Note: See details in 11.1.3.4 of TR 11071—Part 2.	Yes (12.4)	No spec.	No spec.	No spec.	No spec.
24	Requirements for electric safety devices (A and B)	Yes (14.1.2 and 12.4) (12.7)	Yes (306.9, 306.5, and 306.4)	Yes (4.22.9, 4.22.14 and 4.22.4)	No spec.	Yes [P2-29.14, 29.11]
25	Types of normal operating devices specified	Yes (14.2.1.1)	Yes (306.1, 210.1a)	Yes (4.22.1, 3.12.1.1)	Yes [BSLJ-EO 129-9.1(3)]	Yes [P2-29.1]

Asterisk text to item number (eg. 15) in all pages of this Table A2 identify the electric devices that are different from or nonexistent on electric lifts

Annex A—Table A2 (Part 3 of 9)
ELECTRICAL DEVICES
 (Related to Section 11 of TR 11071—Part 2)

No.	REQUIREMENT	CEN	ASME	CSA	JAPAN	SA
26*	Levelling and anti-creep with doors open permitted a) check on levelling or anti-creep limits with an (A) or (B) device b) check on tension in the device for transmission of the car position by an (A) device c) check on speed with (A) or (B) device Note: See 11.1.4 in TR 11071—Part 2.	Yes (14.2.1.2) A or B (14.2.1.2a 2) Yes No	Yes (306.3, 210.1e) No spec. No No	Yes (4.22.3, 3.12.1.3) B [4.22.9, 3.12.9(c)(ii)(d)] No Yes [4.22.9, 3.12.9(c)(iii)(d)]	Yes [NTF-1675-82] No spec. No spec. No spec.	Yes [P2-29.4.1] No spec of device No No
27	Inspection operation required a) check on proper switching to inspection operation by an (A) device b) switch must be bi-stable c) check on speed with (A) or (B) device	Yes (14.2.1.3) Yes Yes No	Yes [306.2, 210.1d] Yes [306.2, 210.1d(6)b] No No	Yes (4.22.2, 3.12.1.2) Yes [4.22.2, 3.12.1.2.2(a)(i), 3.12.2.10] No Yes [4.22.9, 3.12.9(c)(iii)(d)]	Yes [BSLJ-EO 129-9.1(3) & (4)] Yes [BSLJ-EO 129-9.1(3) & (4)] Yes [BSLJ-EO 129-9.1 (4)] No	Yes [P2-29.3] No Yes No
29	Docking/truck zone operation permitted —check on travel limits (A) or (B) and key operated safety contact (A)	Yes (14.2.1.4) (14.2.1.4b/g3)	Yes [306.3, 210.1e]	Yes [4.22.3, 3.12.1.3(n)]	No spec.	—
30	Stop switch requirements (A) a) in pit b) in pulley room/secondary level c) car top d) inside car and accessible to passengers —if solid door (CEN) or passenger lift (ASME/CSA) —if perforated door or enclosure (CEN) or freight lift (ASME/CSA) —if no car doors e) inside car and not accessible to passenger	(14.2.2) Yes (5.7.3.4) Yes (6.4.5) Yes [8.15(b)] Prohibited (14.2.2.1) except for docking operation Yes (14.2.2.2) Yes (14.2.2.2) No	(306.4, 210.2) Yes [306.4(a)(1), 210.2g] Yes [300.2, 101.3e] Yes [306.4(a)(2), 210.2h] No Yes [306.4(b)(1), 212.2e] N/A Yes [306.4(b)(6), 210.2v]	(4.22.4, 3.12.2) Yes [4.22.4.2(b), 3.12.2.8] No Yes [4.22.4.2(c), 3.12.2.9] No Yes [4.22.4.2(a), 3.12.2.5] N/A Yes [4.22.4.3(a), 3.12.2.9]	No spec. No spec. Yes [BSLJ-EO 129-9.1(4)] Yes [BSLJ-EO 129-9.1(4)] Yes [BSLJ-EO 129-9.1(4)] N/A Yes [BSLJ-EO 129-9.1(4)]	Yes [P2-29.14] Yes [P2-30.3, 10.6] Yes [P2-30.4, 30.5.5] [6.7]? Yes [P2-30.2, 26.10] Yes [P2-30.1] Yes N/A —
31	Terminal landings					
31.1	Final terminal limit switches (A) required —operated directly by car or indirectly by a device linked to car, with linkage being controlled by a safety device type (A)	Yes (10.5.3.1) Both (10.5.2.3)	No (305.3) —	No —	Yes [NTF-1675-82] No spec.	Yes [31.3] Top only

Annex A—Table A2 (Part 4 of 9)
ELECTRICAL DEVICES
 (Related to Section 11 of TR 11071—Part 2)

No.	REQUIREMENT	CEN	ASME	CSA	JAPAN	SA
31.2*	Normal terminal stopping device must use a control device separate from:				NTF-1675-'82	
	—final limit switches	Yes (10.5.2.1)	N/A	N/A	Yes	Yes [31.3.1(d)]
	—normal stopping and emergency terminal stopping means	No spec.	Yes [305.1a and 305.2(b)(1)]	Yes [4.21.2.2a]	Yes	Yes [31.2.1]
31.3*	—be operated directly by car or through a linkage, in which case the linkage must be checked (A)	No spec.	Yes [305.1b, 305.1d]	Yes (4.21.1.2, 4.21.1.4)	No spec.	Yes [31.2.3]
	Emergency terminal speed limiting device when reduced stroke buffers are used or for up-direction if car speed exceeds 0.51 m/s — required	No spec.	In both cases [305.2a]	r.s. buffers (4.21.2.1)	N/A	Not specified
	—be of type (A) or (B) —independent of normal terminal stopping devices	— —	Yes Yes (305.2(b)(1))	Yes Yes (4.21.2.2a)		
32	Electrical outlet required					
	—in pit	Yes (5.7.3.4)	Yes [300.7, 106.1e4]	Yes (4.2.1, C22.1 Sec. 38-054)	No spec.	No
	—in machine room	Yes (6.3.6)	Yes [300.2, 101.5c]	Yes (2.4.1, C22.1 Sec. 38-052)	Yes [BSLJ-EO 129-8(3)]	Yes [P2-5.16]
33	—in pulley room/secondary level	Yes (6.4.7)	Yes [300.2, 101.5c]	No	No spec.	No
	—on car top	Yes (8.15c)	Yes [301.7, 204.7a4]	No	No spec.	Yes [P2-26.11]
	Lighting (minimum lux if specified)					
33	—in pit	Yes (5.9)	54 (300.7, 106.1e)	100 [4.4.2, 2.7.5.1, C22.1 Sec. 38-054]	No spec.	Yes [P2-10.5]
	—along well walls	Yes (5.9)	No	No	No spec.	Yes [P2-11.3]
	—in machine room	200 (6.3.6)	108 (300.2, 101.5a)	100 [4.1.2, 4.2, 2.3.5.1, C22.1 Sec. 38-052]	Yes [BSLJ-EO 129-8(3)]	110 [P2-5.13]
33	—pulley room/secondary level	Yes (6.4.7)	100 (300.2, 101.5a)	100 (4.1.2, 4.2, 2.3.5.1, C22.1 Sec. 38-052)	No spec.	No
	—at landing	50 (7.6.1)	54 (300.11, 110.10b)	50 (4.8, 2.11.9.2)	No spec.	No
	—in car	50 (8.17.1)	54 (301.7, 204.7a)	50 (4.15, 3.6.7.1)	No spec.	50 [P2-23.25.2.1]
33	—passenger	50 (8.17.1)	27 (301.7, 204.7a)	25 (4.15, 3.6.7.1)	No spec.	30 [P2-23.25.2.1]
	—freight	1W (8.17.3)	2.2 (301.7, 204.7a)	2 (4.15, 3.6.7.1)	1 or more [BSLJ-EO 129-9.1(12)]	20 [P2-23.25.2.1]
	—emergency					