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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 8104-1

Improvement of safety and accessibility on existing lifts, escalators and moving walks —

Part 1: Improvement of safety of passengers and goods passenger lifts

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ISO/TC 178

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

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

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

This document was prepared by Technical Committee ISO/TC 178, *Lifts, escalators and moving walks*.

A list of all parts in the ISO 8104 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document was developed to establish a methodology to support at national level procedures for improving the safety of existing lifts. A word of explanation:

a) **Background of this document:**

More than 18 million lifts are in use today (2024) in the world.

Lifts were installed to the safety level appropriate at time of installation. This level is often lower than today's state-of-the-art for safety.

New technologies, experiences and social expectations have led to today's state-of-the-art for safety. This has led to the situation today with different levels of safety. However, users and authorized persons expect a common minimum level of safety wherever they go.

In addition, there is a growing trend for people to live longer and for disabled people to expect access and design for all. Therefore, it is especially important to provide a safe means of vertical transport for elderly and disabled persons.

Lift attendants and in many cases building caretakers are not so common anymore, so it is important that relevant safety features for the rescue of trapped persons should be provided.

Furthermore, the life cycle of a lift is longer than most other transportation systems and building equipment, which therefore means that lift design, performance and safety can fall behind modern technologies. If existing lifts are upgraded to today's state-of-the-art for safety, the number of injuries is very likely to decrease (especially in buildings which can be accessed by the general public).

b) **The approach behind the creation of this document:**

This document:

- 1) categorizes various hazards and hazardous situations, each of which has been analysed by a risk assessment;
- 2) is intended to provide corrective actions to progressively and selectively improve, step by step, the safety of all existing passenger and goods passenger lifts towards today's state-of-the-art for safety;
- 3) enables each lift to be audited and safety measures to be identified and implemented in a step by step and selective fashion according to the frequency and severity of any single risk;
- 4) lists the high, medium and low risks and corrective actions which can be applied in separate steps in order to mitigate the risks.

Other designs to previous national regulations or standards, providing they have an equivalent safety level, may be acceptable.

c) **Use of this document:**

This document can be used as a guideline for:

- 1) national authorities to determine their own programme of implementation in a step by step process via a filtering process (see [Clause 5](#)) in a reasonable and practicable¹⁾ way based on the level of risk (e.g. high, medium, low) and social and economic considerations;
- 2) owners to follow their responsibilities according to existing regulations;

1) "Reasonable and practicable" is defined as follows: "In deciding what is reasonable and practicable the seriousness of a risk to injury should be weighed against the difficulty and cost of removing or reducing that risk. Where the difficulty and cost are high, and a careful assessment shows that the risk is rather low, short or medium term action may not need to be taken. On the other hand where the risk is high, action should be taken at whatever cost."

- 3) maintenance companies and/or inspection bodies to inform the owners on the safety level of their installations and to propose risk reduction measures;
- 4) owners to upgrade their existing lifts on a voluntary basis in accordance with 3) if no regulations exist.

NOTE 1 Owner of the installation: natural or legal person who has the power of disposal of the installation and takes the responsibility for its operation and use.

In making an audit of an existing lift installation [Annex A](#) can be used to identify the hazards and corrective actions in this document. However, where a hazardous situation is identified which is not covered in this document a separate risk assessment should be made. This risk assessment should be based on ISO 14798:2009.

NOTE 2 The risk profile according to ISO 14798:2009 has been slightly modified in order to define different priorities for the upgrading of items on existing lifts depending on the risk levels of the existing means (see [5.3](#) and [5.4](#)). The probability level D is covering a large range of probabilities between level C and level E. Due to this reason the largest number of risks in existing lifts would fall into level D. Therefore level D has been split into 3 smaller sub-levels C-D, D and D-E. Higher probabilities C-D which may lead to a high number of incidents are close to C and therefore are considered with high priority for severities 1 and 2 and with medium priority for severity 3. Lower probabilities D-E where only very few incidents may be expected being close to E are considered with medium priority for severity 1 in between high for 1 D and low for 1 E and with low priority for severity 2 as for 2 E.

Improvement of safety and accessibility on existing lifts, escalators and moving walks —

Part 1:

Improvement of safety of passengers and goods passenger lifts

1 Scope

1.1 This document gives a methodology for improving the safety of existing passenger and goods passenger lifts with the aim of reaching an equivalent level of safety to that of newly installed lifts by the application of today's state-of-the-art for safety.

This document prioritizes improvements of safety based on objective hazard analysis but does not define a methodology for achieving full compliance to current standards for new installations.

NOTE Due to situations such as the building design, etc. it may not be possible in all cases to reach today's state-of-the-art for safety.

This document applies to permanently installed passenger or goods passenger lifts, with traction, positive or hydraulic drive serving defined landing levels, having a car designed for the transportation of persons or persons and goods and moving along guide rails inclined not more than 15° to the vertical.

This document includes the improvement of safety of existing lifts for:

- a) passengers;
- b) maintenance and inspection personnel;
- c) persons outside the well, machinery space(s) and the pulley room(s) (but in their immediate vicinity);
- d) any other authorized persons.

1.2 This document is not applicable to:

- e) lifts with drive systems others than those mentioned above;
- f) hydraulic lifts:
 - 1) with a rated speed exceeding 1 m/s;
 - 2) where the setting of the pressure relief valve exceeds 50 MPa;
- g) lifting appliances such as paternosters, mine lifts, theatre lifts, appliances with automatic caging, skips, lifts and hoists for building and public works sites, ships' hoists, platforms for exploration or drilling at sea, construction and maintenance appliances;
- h) installations where the inclination of the guide rails to the vertical exceeds 15°;
- i) lifting appliances with a rated speed lower than or equal to 0,15 m/s;
- j) safety during transport, installation, repairs and dismantling of lifts.

However, this document can usefully be taken as a reference basis.

1.3 This document does not cover

- a) Improvement of safety for specific items like vandalism, seismic conditions, fire issues, etc.
- b) Improvement of accessibility

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 8100-1:2019, *Lifts for the transport of persons and goods — Part 1: Safety rules for the construction and installation of passenger and goods passenger lifts*

ASME A17.1-2022, *Safety Code for Elevators and Escalators*

ASME A17.3-2023, *Safety Code for Existing Elevators and Escalators*

ASME A17.7-2007, *Performance-Based Safety Code for Elevators and Escalators*

EN 81-21:2022, *Safety rules for the construction and installation of lifts — Lifts for the transport of persons and goods — Part 21: New passenger and goods passenger lifts in existing building*

EN 81-28:2022, *Safety rules for the construction and installation of lifts — Lifts for the transport of persons and goods — Part 28: Remote alarm on passenger and goods passenger lifts*

EN 81-58:2022, *Safety rules for the construction and installation of lifts — Examination and tests - Part 58: Landing doors fire resistance test*

ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

ISO 14798:2009, *Lifts (elevators), escalators and moving walks — Risk assessment and reduction methodology*

JIS A 4307-1:2019, *Lifts for the transport of persons and goods — Part 1: Passenger and goods passenger lifts*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply / the terms and definitions given in ISO 8100-1:2019 and the following apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

existing lift

lift which is in service

4 List of significant hazards dealt with by this document

This clause contains all the significant hazards, hazardous situations and events, as far as they are dealt with in this document, identified by risk assessments as significant for existing lifts and which require action to eliminate or reduce the risk.

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No.	Hazard/Hazardous situation
1	General
1.1	Presence of harmful materials
2	Well
2.1	Inadequate locking devices on access, emergency and inspection doors to well and pit
2.2	No stopping of car when access, emergency and inspection doors to well or pit are opened
2.3	Well enclosures with perforate walls
2.4	Well enclosures with perforate walls near door locks
2.5	Partially enclosed well with too low enclosure
2.6	Inadequate vertical surface below landing door sills
2.7	Counterweight/balancing weight without safety gear in case of accessible spaces below well
2.8	No or inadequate screen of counterweight/balancing weight in the pit
2.9	No or inadequate partition in the pit for lifts in a common well
2.10	No or inadequate partition between moving parts of lifts in a common well
2.11	Insufficient refuge spaces and clearances in headroom
2.12	Insufficient refuge spaces and clearances in pit
2.13	No or inadequate means to enter the pit
2.14	No or inadequate lighting of the well
2.15	No or inadequate stopping device in the pit
2.16	No alarm initiation devices in pit and on car roof
2.17	Excessive horizontal distance between the inner surface of the well and the sill, door frame of the car or closing edge of car sliding doors
2.18	Excessive horizontal distance between car door and landing door
2.19	Too large distance between leading edges of car and landing doors
3	Machinery spaces and pulley rooms
3.1	No or unsafe means of access to machinery spaces and pulley rooms
3.2	Inadequate lighting in machinery spaces and pulley rooms
3.3	No or inadequate stopping device(s) in the pulley room
3.4	Inadequate suspension points for handling of equipment in machinery spaces and top of the well
3.5	Slippery floor in machinery spaces or pulley rooms
3.6	Insufficient horizontal or vertical clearances in machinery spaces
3.7	No or inadequate protection on different levels and recesses in the machine room
3.8	No or inadequate intercom system between car and the location of the emergency operation
4	Landing doors and car doors
4.1	Perforate landing doors
4.2	Perforate car doors
4.3	Inadequate strength of landing doors
4.4	Inadequate strength of car doors
4.5	Inadequate glass in landing doors other than vision panels
4.6	Inadequate glass in car doors other than vision panels
4.7	Inadequate glass vision panels in landing doors
4.8	Inadequate glass vision panels in car doors
4.9	No or inadequate protective device (e.g. light curtain) for re-opening of power operated car and landing sliding doors
4.10	No or inadequate protective device (150 N) for re-opening of power operated sliding doors
4.11	No or inadequate protective device (150 N) for re-opening of power operated doors other than sliding doors

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No.	Hazard/Hazardous situation
4.12	No or inadequate means against dragging of children hands in horizontally sliding car doors or landing doors with glass
4.13	No or inadequate lighting on landings
4.14	No safe locking device on landing door
4.15	No special device (e.g. triangular key) for emergency unlocking of landing door
4.16	No or inadequate self-closing and locking of the landing door after opening for whatever reason when the car is outside the unlocking zone
4.17	Inadequate link between multiple panels of landing doors (missing interlink or missing locking)
4.18	Inadequate fire resistance of landing doors
4.19	Car door moving with open (hinged) landing door
4.20	Car without door(s)
4.21	No car door restrictor where the landing door locking device is accessible when the car door is opened outside of the door zone
5	Car, counterweight and balancing weight
5.1	Large car area in relation to rated load
5.2	No car apron or inadequate length of car apron
5.3	Unsafe locking of emergency trap door on the car
5.4	Insufficient strength of car roof and emergency trap door
5.5	No or inadequate protection against falling from car roof
5.6	Insufficient ventilation in car
5.7	Inadequate lighting in car
5.8	No or inadequate emergency lighting in car
5.9	No emergency lighting on the car roof
5.10	No or inadequate load control
5.11	No or inadequate remote alarm system
6	Suspension means, compensation means, precautions against free fall, excessive overspeed, unintended car movement and creeping of the car
6.1	No or inadequate protection against injury from traction sheaves, pulleys or sprockets
6.2	No or inadequate protection against rope/chains leaving the sheaves, pulleys or sprockets
6.3	No or inadequate protection against the introduction of objects between ropes/chains and sheaves, pulleys or sprockets
6.4	No or inadequate protection against free fall or descent with excessive speed
6.5	No or inadequate protection means against ascending car overspeed on traction drive lifts with counterweight
6.6	No or inadequate protection means against unintended car movement with open doors
6.7	No or inadequate protection against creeping on hydraulic lifts
6.8	No or inadequate slack rope switch for governor rope
6.9	No or inadequate slack rope/chain detection device
7	Guide rails, buffers and final limit switches
7.1	Inadequate guidance system for counterweight or balancing weight
7.2	No or inadequate buffers
7.3	No or inadequate final limit switches
8	Lift machine
8.1	Inadequate machine brake (only one brake set)
8.2	No or inadequate emergency operation system
8.3	No or inadequate means for stopping the machine and checking its stopped position
8.4	No motor run-time limiter

No.	Hazard/Hazardous situation
8.5	No shut-off valve (hydraulic lifts)
8.6	No or inadequate low cylinder pressure device on hydraulic lifts
9	Electric installations and appliances
9.1	Insufficient protection against electric shock (direct contact)
9.2	Insufficient marking of connection terminals which remain live after switching off the main switch
9.3	No or inadequate protection against overheating of lift machine motor
9.4	No lockable main switch
9.5	No or inadequate stopping device at the machine in the machinery space
10	Protection against electric faults, controls, priorities
10.1	No earth fault protection in circuits with electric safety devices or in circuits controlling the brake or the down valve
10.2	No protection against phase reversal
10.3	Inadequate levelling and/or stopping accuracy
10.4	No or inadequate inspection control station and stopping device on the car roof
10.5	No or inadequate inspection control station in the pit
11	Notices, markings and operating instructions
11.1	Missing notices, markings and operating instructions

5 Methodology for improving the safety of existing lifts

5.1 General

All technical solutions for upgrading existing lifts should be aligned as much as possible to the state-of-the-art solutions applicable for new lifts. The requirements and/or protective measures documented in today's state-of-the-art standards for new lifts should not be considered as the only possible solution. Alternatives are possible, provided they lead to an equivalent or higher safety level. Although immediate upgrading of all existing lifts to the state-of-the-art would be preferable from the safety point of view, this may not be possible in a short period of time mainly due to economic reasons.

This document does not provide legally binding requirements for measures to be carried out or for the period of time for such measures. Such obligations for existing lifts are subject to national legislation. The procedures described in this clause are intended to assist in setting up national regulations and/or providing a systematic approach to the lift owners for increasing the safety of existing lifts by showing:

- how to identify hazards;
- how to evaluate the existing hazardous situations; and
- how to classify priority levels which apply to the relevant hazards and risk reduction measures.

Where the requirements of this document cannot be met and a residual risk related to hazards in Table 1 remains, or cannot be avoided, then appropriate measures such as signs, instructions and training shall be given.

Before upgrading a lift by one or several of the appropriate measures, the consequences to other parts of the lift shall be considered. This may lead to further modifications to align the interfaces and to prevent lowering the safety in other areas of the lift.

After the upgrading of a lift by one or several of the appropriate measures the remaining hazardous situations shall be documented and recorded for future upgrades and general awareness to manage any residual risks.

In a periodic scheme or whenever the use of the lift has changed, a new audit shall be carried out in order to check whether the previous assessment needs to be updated.

5.2 Identification of hazardous situations

[Annex A](#) contains checklists which shall be used for identification of the hazardous situations relevant for an individual lift. This list contains all hazardous situations indicated in 4. The hazardous situations have been listed on the basis of experience gathered from registered accidents as well as specific risk assessments. The state-of-the-art for safety of the relevant ISO, CEN, ASME, ... served as a basis for risk reduction measures.

There may be additional hazardous situations for very old lifts or lifts with special technology which are not covered by this document. In this case additional risk assessments shall be performed to identify hazards and risk reduction measures.

The identification of the hazardous situation can be carried out in the course of any periodical survey or special examination on a given installation, but only technically competent persons should be allowed to carry out these examinations. This can be subject to national regulations.

When extreme risks are identified during an audit immediate action to mitigate or lower the risk shall be taken if the lift is kept in service. Corrective actions shall be carried out before lift is brought back to service.

5.3 Evaluation of hazardous situations

The hazardous situations as listed in 4 were subjected to risk assessment in preparation for this standard.

The risk assessment was based on the assumption that an existing lift either has no or insufficient equipment for preventing the hazardous situations.

[Table 2](#) shows the original risk profile which can be present in existing lift installations which have not been brought up to safety levels in accordance with state-of-the-art standards.

In the risk profile in [Table 2](#) some risks appear twice. The background for this double assessment is that some hazardous situations can lead to different effects, e.g., to high severity with a lower probability and to medium severity with a higher probability. Accident statistics may show different experiences from country to country. In these cases, the double assessments should demonstrate that, even if high severity accidents may not be experienced, there is still a certain probability for medium severity accidents.

Table 2 — Original risk profile

Level of probability	Level of severity			
	1	2	3	4
	Number of hazardous situation			
A				
B			4.9/4.10/4.11	
C		2.3/4.1/4.2/4.9 4.10/4.11/8.2	4.19/5.8/7.3	
C-D	10.4	2.6/2.13/2.14/3.1 3.2/3.7/4.5/4.6/4.7 4.8/4.20/5.11 6.4/7.2/10.3	4.13/5.7	
D	1.6/2.1/2.2/2.4/2.5/2.9 2.10/2.11/2.12/2.14 2.15/2.17/2.18/2.19 3.3/4.3/4.5/4.6/4.7 4.8/4.14/4.15/4.16 4.20/5.2/5.5/5.11/6.4 6.6/6.7/8.1/8.2/8.3 9.1/9.2/9.4/10.3	2.16/3.4/3.6/4.4 4.12/5.3/5.6/6.1 6.2/6.5/6.9/8.6	5.4/6.3/8.4/8.5	
D-E	3.8/4.17/4.18/4.21 6.5/6.8/10.1/11.1	3.5/5.1/5.10/7.1 9.3/9.5/10.2/10.5		
E	2.7/2.8/3.4/5.10/7.1	5.9		

Table 2 (continued)

Level of probability	Level of severity			
	1	2	3	4
	Number of hazardous situation			
F				
Level of probability: A Highly probable, B Probable, C Occasional, D Remote, E Improbable, F Highly improbable			Level of severity: 1 High, 2 Medium, 3 Low, 4 Negligible	
NOTE 1 Numbers in cells correspond to the number of hazardous situations as listed in Table 1.				
NOTE 2 For the significance of shading patterns see Table 3 .				
NOTE 3 For reasons of practical application, the frequency category D was subdivided into C-D, D and D-E.				

[Table 2](#) does not strictly apply to every existing lift. Earlier local requirements valid in individual countries may already include requirements which cover many of the hazardous situations in 4. Some of these requirements can be regarded as almost equivalent to the state-of-the-art standards.

Some of these requirements may have just partially covered the hazardous situations, which means that the remaining residual risk may be still too high compared with the safety level which is achieved for a lift in accordance with the state-of-the-art standards.

This is why re-evaluating the risks and comparing with previous national standards will lead to filtering the risk profile. On the one hand hazardous situations covered by almost equivalent requirements can be eliminated from the risk profile. On the other hand the residual risk can be re-evaluated and re-ranked in the risk profile. This filtering process may be done at national level.

The risk caused by no or inadequate lighting of the well (risk number 2.14) should serve as an example here:

Considering the worst case the risk assessment implies that no well lighting exists. The respective risk is evaluated at severity level 1 and probability level D and also at 2 C-D. Consequently the risk levels in the original risk profile (see [Table 2](#)) are high, which means that risk-reducing measures are necessary in any case.

Former valid standards already required permanently installed well lighting. Such well lighting had to be mounted at determined positions in the well, but, in contrast to more recent standards, a defined intensity of illumination was not required.

Therefore, the well lighting used earlier cannot be considered to be equivalent to the well lighting used today. However, lifts equipped with well lighting in accordance with former standards have certainly a lower residual risk than lifts without well lighting. Consequently, the remaining residual risk can be shifted to lower risk levels than the original risk profile, i.e. to 1 D-E or 2 D, for example.

5.4 Classification of priority levels

As mentioned before, upgrading all existing lifts to the state-of-the-art for safety at the same time may not be possible for various reasons. This is why a procedure is recommended here which allows subdivision of the hazardous situations in priority levels which then can be mitigated in several timed steps by the respective measures proposed in this document.

The priority levels in [Table 3](#) and [Table 4](#) have been specified for the purpose of this document slightly deviating from the safety levels of the risk profile according to ISO 14798:2009. The risk profile is subdivided in 4 priority levels (see [Table 3](#) and [Table 4](#)) where only three of them are of practical relevance.

These priority levels are defined in accordance with safety considerations only. However, implementation of measures to mitigate the risk is also a question of economic consideration.

The priority levels can be assigned to a schedule for the implementation of the measures. [Table 4](#) also contains a possible schedule.

Table 3 — Modified risk profile with priority levels

Level of probability	Level of severity			
	1	2	3	4
	Priority level			
A	Extreme	Extreme	High	Low
B	Extreme	High	High	Low
C	Extreme	High	Medium	
C-D	High	High	Medium	
D	High	Medium	Low	
D-E	Medium	Low		
E	Low	Low		
F				
Level of probability: A Highly probable, B Probable, C Occasional, D Remote, E Improbable, F Highly improbable			Level of severity: 1 High, 2 Medium, 3 Low, 4 Negligible	

Table 4 — Priorities and implementation

Fields in risk profile		Priority	Implementation
S	P		
1 2	A, B, C A	Extreme	Immediate
1 2 3	C-D, D B, C, C-D A, B	High	Short-term
1 2 3	D-E D C, C-D	Medium	Medium term or together with a major modernization
1 2 3 4	E D-E, E D A, B	Low	Long term or together with a modernization of the related component
1 2 3 4	F F D-E, E, F C, C-D, D, D-E, E, F	-	-
Level of probability: A Highly probable, B Probable, C Occasional, D Remote, E Improbable, F Highly improbable			Level of severity: 1 High, 2 Medium, 3 Low, 4 Negligible
NOTE The length of the terms is subject to national filtering, e.g. short-term within 5 years, medium term within 10 years			

6 Verification of safety measures and/or protective devices

Before putting a lift back into service after modifications it shall be subject to examinations and tests in accordance with applicable state-of-the-art standards or national regulations.

Modifications made on a specific component may have implications on the safety or function of other associated components and systems. Therefore, the examinations and tests after modification shall not be limited only to those items modified but shall include these additional affected components and systems.

7 Information for use

Relevant documentation shall be provided for those components which are modified, replaced or added.

Important modifications shall be recorded in the technical part of the register or file according to ISO 8100-1:2019, 7.3.

Annex A **(normative)**

Safety checklists for existing lifts

A.1 General

The safety checklists in this Annex (see [A.2](#) to [A.4](#)) shall be used as a tool to identify the significant hazards on an existing lift and to determine which type of protective measure(s) according to today's state-of-the-art standards are applicable. It may be amended taking into account national filtering (see [Clause 5](#)) and local requirements.

Alternative protective measures may be chosen, provided they lead to an equivalent safety level.

A risk assessment shall be made on a case by case basis for safety items not covered in this document.

If a risk is re-evaluated, this re-evaluation should be done following the risk analysis methodology (ISO 14798:2009) used to establish this document.

A.2 Safety checklist for upgrading of existing lifts to the state-of-the-art according to ISO 8100-1:2019

For many items in [Table A.2](#) the safety level of ISO 8100-1:2019 compared to EN 81-1/-2:1998 or other equivalent national standards based on EN 81-1/-2:1998 is equal. However, there are some items where the safety level has been slightly increased like inspection control in the pit (ISO 8100-1:2019, 5.2.1.5.1 b), equal to EN 81-20:2014) or refuge spaces.

The difference in safety level of such items is identified in the last column of [Table A.2](#). In case of a "0" in the last column the protective measures in ISO 8100-1:2019 compared with EN 81-1/-2:1998 or other equivalent national standards based on EN 81-1/-2:1998 are either equal or the difference in safety level is marginal and can therefore be ignored. In cases of significant differences in safety level between lifts in compliance with ISO 8100-1:2019 and lifts in compliance with EN 81-1/-2 or other equivalent national standards based on EN 81-1/-2:1998 the priority level of such items is indicated and conditions for different priority levels are specified if applicable.