
**Safety requirements for lifts (elevators) —
Part 1:
Global essential safety requirements
(GESRs)**

Exigences de sécurité des ascenseurs —

Partie 1: Exigences essentielles de sécurité globale des ascenseurs
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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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.

ISO/TS 22559-1 was prepared by Technical Committee ISO/TC 178, *Lifts, escalators, passenger conveyors*.

ISO/TS 22559 consists of the following parts, under the general title *Safety requirements for lifts (elevators)*:

- *Part 1: Global essential safety requirements (GESRs)*

Further parts are under preparation:

- *Part 2: Safety parameters meeting the GESRs*
- *Part 3: Global conformity assessment procedures for lifts*

0 Introduction

0.1 After the publication of parts 1 and 2 of ISO/TR 11071, discrepancies were noted in the lift safety standards, and it was agreed that there was a need for an ISO publication that would set global essential safety requirements for lifts (elevators). The work, however, could start only after ISO/TS 14798 was completed. This methodology was a critical tool in the development of ISO/TS 22559 on safety requirements for lifts.

0.2 The objective of this series of Technical Specifications is

- a) to define a common global level of safety for all people using, or associated with, lifts (elevators);
- b) to facilitate innovation of lifts (elevators) not designed according to existing local, national or regional safety standards, while maintaining equal levels of safety; if such innovations become state of the art, they can then be integrated into the detailed local safety standard, at a later date; and
- c) to remove trade barriers.

NOTE ISO/TS 22559-2 will contain global essential safety parameters (GESPs) for lifts (elevators) that should further assist in the use and implementation of the GESRs specified in this part of ISO/TS 22559.

0.3 Clause 4 describes the approach and methodology used in the development of this part of ISO/TS 22559. Clause 5 gives instructions for the use and implementation of GESRs. The GESRs are presented in Clause 6. Each GESR specifies a safety objective, i.e. what is to be achieved, not how to do it. This allows innovation and development of future technologies. Annex A gives an overview of GESRs in relation to lift subsystems.

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0.4 This part of ISO/TS 22559 is a basic safety standard in terms of ISO/IEC Guide 51.

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Safety requirements for lifts (elevators) —

Part 1: Global essential safety requirements (GESRs)

1 Scope

1.1 This part of ISO/TS 22559

- specifies global essential safety requirements (GESRs) for lifts (elevators), their components and functions, and
- establishes a system and provides methods for minimizing safety risks that may arise in the course of, the operation and use of, or work on, lifts (elevators).

NOTE 1 Hereinafter in this part of ISO/TS 22559, the term “lift” is used instead of the US term “elevator”.

NOTE 2 See Clause 5 regarding the use and application of this Technical Specification.

1.2 This part of ISO/TS 22559 is applicable to lifts that are intended to carry persons, and that can

a) be located in any permanent and fixed structure or building, except lifts located in

- 1) private residences (single family units), and
- 2) means of transport, e.g. ships;

b) have any

- 1) rated load, size of load carrying unit and speed, and
- 2) travel distance and number of landings;

c) be affected by fire in the load-carrying unit (LCU), earthquake, weather or flood;

d) be misused (e.g. overloaded) but not vandalized.

1.3 This part of ISO/TS 22559 does not specifically cover

a) all needs of users with disabilities¹⁾, or

b) risks arising from

- 1) work on lifts under construction or during alterations and dismantling,
- 2) use of lifts for fire fighting and emergency evacuation,

1) Although the GESRs specified in this part of ISO/TS 22559 have been identified and evaluated by risk assessment, not all disabilities or combinations of such disabilities of users have necessarily been addressed.

- 3) vandalism, and
- 4) fire outside the LCU.

2 Normative references

The following referenced documents are indispensable for the application 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/IEC Guide 51:1999, *Safety aspects — Guidelines for their inclusion in standards*

ISO/TS 14798:2000, *Lifts (elevators), escalators and passenger conveyors — Risk analysis methodology*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the following terms and definitions apply.

3.1 authorized person
person with authorization to access restricted lift areas [e.g. machinery spaces, lift well (hoistway), pit and LCU top] and to work therein, for the purpose of inspecting, testing and maintaining the lift or for rescuing users from a stalled load-carrying unit (LCU)

3.2 cause
trigger mechanism to the hazard, which will cause the incident or effect

[ISO/TS 14798:2000, definition 3.1]

3.3 control
system that governs the starting, acceleration, speed, deceleration and/or stopping of the LCU

3.4 corrective action
action taken to reduce risk

3.5 counterweight
mass that contributes traction in the case of a traction lift, or mass that saves energy by balancing all or part of the mass of the LCU (car) and the rated load

3.6 door access entrance
(landing or LCU) mechanical device (including devices that partially or fully enclose the opening) used to secure an LCU or landing entrance

3.7 electromagnetic compatibility EMC
degree of immunity to incident electromagnetic radiation and level of emitted electromagnetic radiation of electrical apparatus

3.8**essential safety requirement****ESR**

requirement intended to eliminate or sufficiently mitigate the risk of harm to users, non-users and authorized persons using, or associated with, lifts

3.9**fully loaded LCU**

LCU (car) with its rated load

3.10**global essential safety requirement****GESR**

globally agreed upon essential safety requirement

NOTE See 4.3.3.

3.11**harm**

physical injury or damage to the health of people, or damage to property or the environment

[ISO/TS 14798:2000, definition 3.3] [ISO/IEC Guide 51:1999, definition 3.3]

3.12**harmful event**

occurrence in which a hazardous situation results in harm

[ISO/TS 14798:2000, definition 3.5] [ISO/IEC Guide 51:1999, definition 3.4]

3.13**hazard**

potential source of harm

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[ISO/TS 14798:2000, definition 3.4] [ISO/IEC Guide 51:1999, definition 3.5]

3.14**hazardous situation**

circumstance in which people, property or the environment are exposed to one or more hazards

[ISO/TS 14798:2000, definition 3.6] [ISO/IEC Guide 51:1999, definition 3.6]

3.15**hoistway****well**

travel path(s) of the LCU and related equipment plus the spaces below the lowest landing and above the highest landing

3.16**hoistway enclosure****well enclosure**

fixed structural elements that isolate the well (hoistway) from all other areas or spaces

3.17**incident****effect**

unforeseen event or occurrence, which can, but does not necessarily, create a risk of harm, including risks possible due to shearing, crushing, falling, impact, trapping, fire, electric shock, exposure to weather, etc.

3.18

landing

floor, balcony or platform used to receive and discharge persons or goods (freight) from the LCU

3.19

lift (GB)

elevator (US)

lifting appliance intended to transport persons with or without goods or freight by means of a power-operated load-carrying unit that is guided by a fixed guiding system from one landing to another, at an angle of more than 75° to the horizontal

NOTE 1 This term does not include mobile or other working platforms or baskets, or lifting appliances used in the course of construction of buildings or structures.

NOTE 2 See ISO/TR 11071-1:1990, Clause 2, for use of the term “lift” versus the term “elevator” in current national standards for lifts.

3.20

load-carrying unit

LCU

car

part of a lift designed to carry persons and/or other goods for the purpose of transportation

3.21

maintenance

process of examination, lubrication, cleaning, adjustments, repair and replacement of lift parts to ensure the safe and intended functioning of the lift and its components after the completion of the installation and throughout its life cycle

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3.22

non-user

person in the vicinity of a lift but not intending to access or use the lift

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3.23

overload

overloaded

load in the LCU exceeds the rated load of the lift

3.24

platform

part of the LCU that accommodates persons and load for the purpose of transportation

3.25

protective measures

means used to reduce risk

[ISO/TS 14798:2000, definition 3.22] [ISO/IEC Guide 51:1999, definition 3.8]

NOTE 1 Protective measures include risk reduction by inherently safe design, protective devices, personal protective equipment, information for use and installation, and training.

NOTE 2 See also definition for “corrective action” in 3.4.

3.26

rated load

load that the lift is designed and installed to transport

3.27**relative movement**

situation where a lift component moves in the vicinity of another lift component that is stationary or that moves at a different speed or in a different direction

NOTE This may also occur in a situation where a lift component moves in the vicinity of a structure where persons can be present.

EXAMPLE Building floor surrounding the lift well (hoistway)

3.28**risk**

combination of the probability of occurrence of harm and the severity of that harm

[ISO/TS 14798:2000, definition 3.15] [ISO/IEC Guide 51:1999, definition 3.2]

3.29**risk analysis**

systematic use of available information to identify hazards and to estimate the risk

[ISO/TS 14798:2000, definition 3.18] [ISO/IEC Guide 51:1999, definition 3.10]

NOTE This method aims to systematically identify and assess hazards, evaluate risks and recommend risk reduction measures.

3.30**risk assessment**

overall process comprising a risk analysis and a risk evaluation

[ISO/TS 14798:2000, definition 3.20] [ISO/IEC Guide 51:1999, definition 3.12]

3.31**risk evaluation**

procedure based on the risk analysis to determine whether the tolerable risk has been achieved

[ISO/TS 14798:2000, definition 3.19] [ISO/IEC Guide 51:1999, definition 3.11]

3.32**severity**

qualitative measure of the worst possible incident (effect) that could be caused by a specific hazard

[ISO/TS 14798:2000, definition 3.14]

3.33**tolerable risk**

risk which is accepted in a given context based on the current values of society

[ISO/TS 14798:2000, definition 3.17] [ISO/IEC Guide 51:1999, definition 3.7]

3.34**transportation**

process in the course of which persons enter, or goods are moved, into an LCU, which is then lifted or lowered to another landing, where the person exits, or goods are removed from, the LCU

3.35**travel path**

path and related space between the lift terminal landings within which an LCU travels

NOTE For "space" above and below terminal landings, see definition 3.15 for "hoistway" or "well".

3.36
uncontrolled movement

situation where

- the LCU moves when, according to design of the lift, it was to remain stationary, or
- the LCU travels at a speed that is beyond the control of the means designed and intended to control the LCU speed during the lift operation

EXAMPLE 1 The LCU starts to move away from a landing while the users are entering or leaving the LCU, due to failure of, or breakdown in, lift components, such as the speed control, drive or brake system.

EXAMPLE 2 The LCU speed exceeds its designed speed or does not decelerate or stop as intended, due to failure of, or breakdown in, lift components, such as the speed control, drive or brake system.

3.37
user

person using the lift for the purpose of normal transportation, without any help or supervision, including a person carrying goods and a person using a specially dedicated operating system to transport goods or loads

NOTE An example of use of a specially dedicated operating system is “independent service” for transport of hospital patients, whereby the operation of the lift is under the sole control of the patient’s attendant.

3.38
working area or space

area or space defined for use by authorized persons to perform maintenance, inspection or testing of the lift

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4 Approach and methodology

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4.1 Background

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4.1.1 During the 1970s, the ISO 4190 series was published which specifies the building dimensions necessary to permit installation of lifts. This series also specified criteria for planning and selection of lifts and standards for lift fittings.

4.1.2 In order to facilitate further standardization of lift installations and components, ISO/TC 178 carried out extensive comparisons of regional and national safety standards and codes for lifts. The results were published in the ISO/TR 11071 series. These Technical Reports gave directions for possible harmonization of several specific design- and safety-related rules in regional and national standards. No agreement among the experts could be reached for global harmonization of most rules, mainly for the following reasons:

- a) the compared standards and codes were based on different assumptions and experiences and written at different stages of industry development, without using a consistent methodology or consistent procedures, as recommended in ISO/IEC Guide 51; and
- b) they were written in prescriptive rather than performance language.

4.1.3 It further became clear that prescriptive standards not only continually lag behind the development of lift technologies and the state of the art, but also present impediments to the progress and innovation of industry. Differences in regional and national safety requirements affecting lift designs also pose barriers to free trade. Therefore, a new approach to the development of lift standards affecting lift safety must be taken.

4.2 Approach

4.2.1 This “product safety standard” has been developed following ISO/IEC Guide 51.

NOTE For definition of term “product safety standard” refer to 7.1 of ISO/IEC Guide 51:1999.