International Standard

ISO 8100-1

Lifts for the transport of persons and goods —

Part 1: Safety rules for the construction and installation of passenger and goods passenger lifts

Ascenseurs pour le transport de personnes et d'objets —

Partie 1: Règles de sécurité pour la construction et l'installation d'ascenseurs et d'ascenseurs de charge

Second edition
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Corrected version
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Foreword

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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 document 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).

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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,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 10, *Lifts, escalators and moving walks,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 8100-1:2019), which has been technically revised.

The main changes are as follows:

— requirements for vertically sliding landing and car doors have been added;

— requirements for suspension means other than steel wire ropes have been added;

— requirements for automatic rescue operation have been added;

— requirements for traction lifts with increased available car area have been added;

— requirements for SIL-rated circuits (previously called PESSRAL) have been revised;

— requirements for a working platform in the pit have been added;

— requirements to avoid the dragging of hands in doors have been extended;

— requirements for compensation means entering the refuge space in the pit have been added;

— requirements for the brake have been aligned with overload limits;

— performance and monitoring of the machine brake have been revised;

— requirements for pit access ladders have been revised;

— fire classification of electric cables has been specified;

— requirements for cybersecurity have been added;

— requirements for emergency operation have been revised;

— bypassing normal travel limits in inspection operation has been added;

— SIL levels of the electric safety devices (Annex A) have been revised;

— short circuit between adjacent conductors of travelling cable has been added to electric fault list;

— mechanical strength of luminaires for the well lighting system has been specified;

— requirements for information for use have been revised;

— requirements for tripping the safety gear by electrical means have been added;

— the position of the inspection operation switch has been revised;

— the document structure has been revised as per the ISO/IEC Directives, Part 2.

For relationship with this document and ISO 8100-20:2018, see Annex D.

ISO/TS 8100-3 provides information on the differences between this document local standards (ASME A17.1/CSA B44 and JIS A 4307 1/JIS A 4307-2) not included in this document.

A list of all parts in the ISO 8100 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.

This corrected version of ISO 8100-1:2026 incorporates the following corrections:

— corrupted symbols in Formulae (3) and (4) have been corrected;

— in 4.2.2.2, the height of the toe board has been corrected from 0,10 mm to 0,10 m;

— reference in Table 25 has been corrected;

— year of publication of ISO 8100-2 has been corrected.

Introduction

This document is a type-C standard as stated in ISO 12100:2010.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

— machine manufacturers (small, medium and large enterprises);

— health and safety bodies (regulators, accident prevention organizations, market surveillance, etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

— machine users/employers (small, medium and large enterprises);

— machine users/employees (e.g. trade unions, organizations for people with special needs);

— service providers, e.g. for maintenance (small, medium and large enterprises);

— consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate in the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations and hazardous events are covered are indicated in the scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

Lifts for the transport of persons and goods —

Part 1:
Safety rules for the construction and installation of passenger and goods passenger lifts

1 Scope

This document specifies the safety rules for lifts permanently serving buildings and constructions and intended for the transport of persons or persons and goods. It applies to traction lifts, positive drive lifts and hydraulic lifts that:

— serve specific levels; and

— have a rated speed exceeding 0,15 m/s; and

— have an enclosed car; and

— move along guide rails inclined not more than 15° to the vertical; and

— are indoor or weather-protected.

This document also applies to the electrical equipment of these lifts including the lighting and socket outlets in the well.

This document specifies safety rules related to:

— persons to be safeguarded:

  — users, including passengers, maintenance and inspection personnel;

  — persons at the landings and outside of the well, or any machinery space and pulley room, who can be affected by the lift.

— property to be safeguarded:

  — loads in the car;

  — components of the lift installation;

  — building in which the lift is installed.

This document does not specify additional requirements for:

— lifts serving buildings with requirements for seismic conditions;

— lifts serving buildings with requirements for accessibility;

— lifts exposed to vandalism;

— lifts which can be used for firefighting and evacuation purposes under firefighters control;

— lifts which can be used to support faster evacuation of persons with disabilities;

— the behaviour of the lift when the control system of the lift receives a recall signal(s) in the event of fire in a building.

This document is not applicable to passenger and goods passenger lifts, which are installed before the date of its publication.

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 1219-1:2012, *Fluid power systems and components — Graphical symbols and circuit diagrams — Part 1: Graphical symbols for conventional use and data-processing applications*

ISO 4344:2022, *Steel wire ropes for lifts — Minimum requirements*

ISO 4190-5:2006, *Lift (Elevator) installation — Part 5: Control devices, signals and additional fittings*

ISO 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 6743-4:2015, *Lubricants, industrial oils and related products (class L) — Classification — Part 4: Family H (Hydraulic systems)*

ISO 7000:2019[1)], *Graphical symbols for use on equipment — Registered symbols*

ISO 7010:2019[1)], *Graphical symbols — Safety colours and safety signs — Registered safety signs*

ISO 8100-2:2026, *Lifts for the transport of persons and goods —Part 2: Design rules, calculations, verifications and tests of lift components*

ISO 8100-33:2022, *Lifts for the transport of persons and goods — Part 33: T-type guide rails for lift cars and counterweights*

ISO 8102-1:2020, *Electrical requirements for lifts, escalators and moving walks — Part 1: Electromagnetic compatibility with regard to emission*

ISO 8102-2:2021, *Electrical requirements for lifts, escalators and moving walks — Part 2: Electromagnetic compatibility with regard to immunity*

ISO 8102-20:2022, *Electrical requirements for lifts, escalators and moving walks — Part 20: Cybersecurity*

ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 12543-2:2021, *Glass in building — Laminated glass and laminated safety glass — Part 2: Laminated safety glass*

ISO 12543-3:2021, *Glass in building — Laminated glass and laminated safety glass — Part 3: Laminated glass*

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

ISO 14122-2:2016, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways*

ISO 14122-3:2016, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails*

ISO 14122-4:2016, *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders*

ISO 29584:2015, *Glass in building — Pendulum impact testing and classification of safety glass*

1) The graphical symbol collections of ISO 7000 and ISO 7101 can be previewed and purchased on the Online Browsing Platform (OBP), www.iso.org/obp

IEC 60204-1:2016+A1:2021, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 60227-6:2001, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V — Part 6: Lift cables and cables for flexible connections*

IEC 60332-1-2:2025, *Tests on electric and optical fibre cables under fire conditions — Part 1-2: Test for vertical flame propagation for a single insulated wire or cable — Procedure for 1 kW pre-mixed flame*

IEC 60364-4-41:2005+AMD1:2017, *Low voltage electrical installations — Part 4-41: Protection for safety — Protection against electric shock*

IEC 60364-6:2016, *Low voltage electrical installations — Part 6: Verification*

IEC 60417:2002[2)], *Database — Graphical symbols for use on equipment*

IEC 60529:1989+AMD1:1999+AMD2:2013, *Degrees of protection provided by enclosures (IP Code)*

IEC 60598-1:2024, *Luminaires — Part 1: General requirements and tests*

IEC 60617:2025, *Database — Graphical symbols for diagrams*

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage systems — Part 1: Principles, requirements and tests*

IEC 60947-4-1:2023, *Low-voltage switchgear and controlgear — Part 4-1: Contactors and motor-starters — Electromechanical contactors and motor-starters*

IEC 60947-5-1:2024, *Low-voltage switchgear and controlgear — Part 5-1: Control circuit devices and switching elements — Electromechanical control circuit devices*

IEC 61310-3:2007, *Safety of machinery — Indication, marking and actuation — Requirements for the location and operation of actuators*

IEC 61508-1:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 1: General requirements*

IEC 61800-5-2:2016, *Adjustable speed electrical power drive systems — Part 5-2: Safety requirements. Functional*

IEC 61810-1:2015+AMD1:2019, *Electromechanical elementary relays — Part 1: General requirements*

IEC 61810-3:2015, *Electromechanical elementary relays — Part 3: Relays with forcibly guided (mechanically linked) contacts*

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 13411-3:2022, *Terminations for steel wire ropes — Part 3: Safety. Ferrules and ferrule-securing*

EN 13411-6:2004+A1:2008, *Terminations for steel wire ropes — Part 6: Safety. Asymmetric wedge socket*

EN 13411-7:2021, *Terminations for steel wire ropes — Part 7: Safety. Symmetric wedge socket*

EN 13411-8:2011, *Termination for steel wire ropes — Part 8: Safety. Swage terminals and swaging*

EN 13501-1:2018, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

EN 13501-6:2018+A1:2022, *Fire classification of construction products and building elements — Part 6: Classification using data from reaction to fire tests on electric cables*

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2) The graphical symbol collections of IEC 60417 can be previewed and purchased on the Online Browsing Platform (OBP), www.iso.org/obp

EN 50214:2024, *Flat polyvinyl chloride sheathed flexible cables*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100:2010 and the following apply.

ISO and IEC maintain terminology 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
apron
smooth vertical part extending downwards from the sill of the landing or car entrance

3.2
automatic operation
operation in which start of the movement of the car happens in response to the momentary actuation of operating devices or in response to any other automatic starting function

Note 1 to entry: See Annex E for additional information.

3.3
automatic rescue operation
device or function that operates automatically in case of failure or loss of power supply to move the lift car to a landing

3.4
average probability of dangerous failure on demand
PFD_{avg}
mean unavailability of a E/E/PE safety-related system to perform the specified safety function when a demand occurs from the lift or lift control system

[SOURCE: IEC 61508-4:2010, 3.6.18, modified — replaced "EUC or EUC control system" with "lift or lift control system"; deleted Notes 1, 2 and 3]

3.5
average frequency of a dangerous failure per hour
PFH
average frequency of a dangerous failure of a E/E/PE safety-related system to perform the specified safety function over a given period of time

[SOURCE: IEC 61508-4:2010, 3.6.19, modified — deleted Notes 1, 2, 3 and 4.]

3.6
balancing weight
mass which compensates all or part of the mass of the car

3.7
buffer
device with characteristics to dissipate or store kinetic energy

3.8
car
part of the lift which carries passengers and goods

3.9
carbon fibre reinforced polymer
CFRP
material consisting of carbon filaments and resin

3.10
counterweight
mass which compensates the mass of the car and a part of the rated load

3.11
direct acting lift
hydraulic lift where the ram or cylinder is directly attached to the car or the car sling

3.12
down direction valve
electrically controlled valve in a hydraulic circuit for controlling the descent of the car

3.13
drive control system
system controlling and monitoring the running of the lift machine

3.14
electrical anti-creep system
measure for hydraulic lifts against the danger of the car moving slowly away from the floor level

3.15
electric safety device
safety contact, safety circuit or SIL-rated circuit, having the required reliability of operation

3.16
electric safety chain
total of the electric safety devices

3.17
full load pressure
static pressure exerted on the piping, jack, valve block, etc., with the car and rated load being at rest at the highest landing level

3.18
goods passenger lift
passenger lift with additional measures for the transport of goods

3.19
headroom
part of the well between the highest landing served by the car and the ceiling of the well

3.20
hold-to-run control device
control device which initiates and maintains machine functions only as long as the manual control (actuator) is actuated

[SOURCE: ISO 12100:2010, 3.28.3]

3.21
hydraulic lift
lift in which movement of the car is operated by hydraulic fluid

3.22
indirect acting lift
hydraulic lift where the ram or cylinder is connected to the car or the car sling by suspension means

3.23
instantaneous safety gear
safety gear without limitation of retardation

3.24
jack
combination of a cylinder and a ram forming a hydraulic actuating unit

3.25
levelling
operation which achieves the stopping accuracy at a landing

3.26
levelling accuracy
vertical distance between car sill and landing sill

3.27
lift machine
unit which drives and stops the lift, including any motor, gear, machine brake, sheave/sprockets and drum (traction or positive drive lift) or comprising the pump, pump motor and control valves (hydraulic drive lift)

3.28
machine room
fully enclosed machinery space outside of the well with ceiling, walls, floor and access door(s) in which machinery as a whole or in parts is placed

3.29
machinery
control cabinet(s) and drive system, lift machine, main switch(es), and devices for emergency and test operation

3.30
machinery space
volume(s) inside or outside of the well where the machinery as a whole or in parts is placed, including the working areas associated with the machinery

3.31
machinery cabinet

fully enclosed volume outside of the well and machine room where the machinery as a whole or parts of it are placed

Note 1 to entry: Related working area is located outside of the machinery cabinet.

3.32
maintenance
process of examination, lubrication, cleaning and adjustments 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

[SOURCE: ISO 8100-20:2018, 3.19]

3.33
minimum breaking force
MBF
specified value in kilonewtons below which the measured breaking force is not allowed to fail in a breaking force test

3.34
mission time
maximum time interval between manufacturing date and replacement date

3.35
non-return valve
valve preventing the discharge of the hydraulic fluid when the pressure is removed from the inlet side

3.36
normal operation
automatic operation wherein the lift is used for transport of passenger or goods, and wherein the car is stopped automatically at the landings

Note 1 to entry: See Annex E for additional information.

3.37
one-way restrictor
valve which allows free flow in one direction and restricted flow in the other direction

3.38
overspeed governor
device to detect excessive speed of the lift and to trigger the operation of devices to stop the lift

3.39
passenger
any person transported in the car

3.40
pawl device
mechanical device for stopping involuntary descent of the car, and maintaining it stationary on fixed supports

3.41
pit
part of the well situated below the lowest landing served by the car

3.42
positive drive lift
lift which is directly driven (not reliant on friction) by drum and ropes or by sprockets and chains or by sprockets and timing belts

3.43
power cycle
restoration of the power supply after it has been unavailable

3.44
preliminary operation
energizing of the lift machine as preparation to a normal run when the car is in the door zone and doors are not closed and not locked

3.45
pressure relief valve
valve to automatically discharge the hydraulic fluid when the pre-set pressure is exceeded

3.46
progressive safety gear
safety gear with limited retardation

3.47
pulley room
room not containing the lift machine, in which pulleys are located, and in which the overspeed governor can also be housed

3.48
rated load
load which is intended to be carried in the car, e.g. passengers or goods, in normal operation