



SLOVENSKI STANDARD
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Nadomešča:

SIST EN 12158-1:2002+A1:2010

Gradbena dvigala za prevoz materiala - 1. del: Dvigala z dostopno dvižno ploščadjo

Builders' hoists for goods - Part 1: Hoists with accessible platforms

Bauaufzüge für den Materialtransport - Teil 1: Aufzüge mit betretbarer Plattform

Monte-matériaux - Partie 1: Monte-matériaux à plates-formes accessibles

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Ta slovenski standard je istoveten z: EN 12158-1:2021

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ICS:

53.020.99	Druga dvigalna oprema	Other lifting equipment
91.220	Gradbena oprema	Construction equipment

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EUROPEAN STANDARD
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EN 12158-1

December 2021

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Supersedes EN 12158-1:2000+A1:2010

English Version

**Builders' hoists for goods - Part 1: Hoists with accessible
platforms**

Monte-matériaux - Partie 1 : Monte-matériaux à plates-
formes accessibles

Bauaufzüge für den Materialtransport - Teil 1: Aufzüge
mit betretbarer Plattform

This European Standard was approved by CEN on 17 October 2021.

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COMITÉ EUROPÉEN DE NORMALISATION
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EN 12158-1:2021 (E)**European foreword**

This document (EN 12158-1:2021) has been prepared by Technical Committee CEN/TC 10 “Lifts, escalators and moving walks”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2022, and conflicting national standards shall be withdrawn at the latest by December 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12158-1:2000+A1:2010.

In comparison with the previous edition, the following technical modifications have been made:

- a) static calculations;
- b) out-of-service wind;
- c) safety requirements for platform locking;
- d) enclosures for platform and landing gates;
- e) requirements for platform inclination on twin-masted units;
- f) integration of performance levels according to EN ISO 13849-1:2015;
- g) monitoring of the inadvertent brake release.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This document is one of a series of standards produced by CEN/TC 10/SC 1 “Building hoists” as part of the CEN programme of work to produce machinery safety standards.

The document is a type-C standard relating to safety for builder’s hoists for goods.

This document is a type-C standard as stated in EN 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 at the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the scope of this document. In addition, machinery shall comply as appropriate with EN ISO 12100:2010 for hazards which are not covered by this document.

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

EN 12158-1:2021 (E)**1 Scope**

1.1 This document deals with power-operated temporarily installed builder's hoists (referred to as "hoists" in this document) intended for use by persons who are permitted to enter sites of engineering and construction, serving landing levels, having a load-carrying device:

- designed for the transportation of goods only;
- guided;
- travelling vertically or along a path within 15° max. of the vertical;
- supported or sustained by drum-driven wire rope, chain, rack and pinion or an expanding linkage mechanism;
- where masts, when erected, require or do not require support from separate structures;
- which permits the access of instructed persons during loading and unloading;
- which are driven by appointed persons;
- which permits, if necessary, during erection, dismantling, maintenance and inspection, the access and travel by persons who are competent and authorized.

1.2 The document deals with the significant hazards, hazardous situations or hazardous events relevant to the machine as listed in Annex C which arise during the various phases in the life of the machine and describes methods for the elimination or reduction of these hazards when it is used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer.

1.3 This document does not specify the additional requirements for:

- hydraulic installations; <https://standards.iteh.ai/catalog/standards/sist/96b5d7b1-0c95-4482-9709-4f572c6b001b/sist-en-12158-1-2022>
- operation in severe conditions (e.g. extreme climates, strong magnetic fields);
- lightning protection;
- operation subject to special rules (e.g. potentially explosive atmospheres);
- electromagnetic compatibility (emission, immunity);
- handling of loads the nature of which could lead to dangerous situations (e.g. molten metal, acids/bases, radiating materials, fragile loads);
- the use of combustion engines;
- the use of remote controls;
- hazards occurring during manufacture;
- hazards occurring as a result of mobility;
- hazards occurring as a result of being erected over a public road;

- earthquakes;
- noise;
- ergonomics;
- fixed guards;
- operator intervention.

1.4 This document does not apply to:

- builder's hoists for persons and materials;
- lifts according to EN 81-3:2000+A1:2008 and EN 81-20:2020;
- inclined hoists according to EN 12158-2:2000+A1:2010;
- work cages suspended from lifting appliances;
- work platforms carried on the forks of fork trucks;
- transport platforms according to EN 16719:2018;
- work platforms;
- funiculars;
- lifts specially designed for military purposes;
- mine lifts;
- theatre elevators;
- special purpose lifts.

1.5 This document deals with the hoist installation. It includes the base frame and base enclosure but excludes the design of any concrete, hard core, timber or other foundation arrangement. It includes the design of mast ties but excludes the design of anchorage bolts to the supporting structure. It includes the landing gates and their frames but excludes the design of any anchorage fixing bolts to the supporting structure.

1.6 This document does not apply to builders' hoists for goods (hoists with accessible platforms) manufactured before the date of publication of this document by CEN.

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EN 12158-1:2021 (E)**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.

EN 81-20:2020, *Safety rules for the construction and installation of lifts — Lifts for the transport of persons and goods — Part 20: Passenger and goods passenger lifts*

EN 1999-1-1:2007,¹ *Eurocode 9: Design of aluminium structures — Part 1-1: General structural rules*

EN 60204-1:2018, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

EN 60204-32:2008, *Safety of machinery — Electrical equipment of machines — Part 32: Requirements for hoisting machines*

EN 60529:1991,² *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN IEC 60947-4-1:2019, *Low-voltage switchgear and controlgear — Part 4-1: Contactors and motor-starters — Electromechanical contactors and motor-starters*

EN 60947-5-1:2017, *Low-voltage switchgear and controlgear — Part 5-1: Control circuit devices and switching elements — Electromechanical control circuit devices*

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

EN ISO 13849-1:2015, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2015)*

EN ISO 13849-2:2012, *Safety of machinery — Safety-related parts of control systems — Part 2: Validation (ISO 13849-2:2012)*

EN ISO 13850:2015, *Safety of machinery — Emergency stop function — Principles for design (ISO 13850:2015)*

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

EN ISO 14118:2018, *Safety of machinery — Prevention of unexpected start-up (ISO 14118:2017)*

EN ISO 14119:2013, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection (ISO 14119:2013)*

ISO 2394:2015, *General principles on reliability for structures*

ISO 2408:2017, *Steel wire ropes — Requirements*

¹ As impacted by EN 1999-1-1:2007/A1:2009 and EN 1999-1-1:2007/A2:2013.

² As impacted by EN 60529:1991/corrigendum May 1993, EN 60529:1991/A1:2000, EN 60529:1991/A2:2013, EN 60529:1991/AC:2016-02 and EN 60529:1991/A2:2013/AC:2019-02.

ISO 4302:2016, *Cranes — Wind load assessment*

ISO 4309:2017, *Cranes — Wire ropes — Care and maintenance, inspection and discard*

ISO 6336-1:2019, *Calculation of load capacity of spur and helical gears — Part 1: Basic principles, introduction and general influence factors*

ISO 6336-2:2019, *Calculation of load capacity of spur and helical gears — Part 2: Calculation of surface durability (pitting)*

ISO 6336-3:2019, *Calculation of load capacity of spur and helical gears — Part 3: Calculation of tooth bending strength*

ISO 6336-5:2016, *Calculation of load capacity of spur and helical gears — Part 5: Strength and quality of materials*

3 Terms and definitions

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

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

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

3.1

builder's hoist

temporary lifting machine serving landing levels on sites of engineering and construction with a platform, cage or other load-carrying device which is guided

3.2

working load

rated load

maximum load which the hoist has been designed to carry in service

3.3

rated speed

speed of the platform for which the equipment has been designed

3.4

wire rope hoist

hoist which uses wire rope as the load suspension system

3.5

positive drive

drive using means other than friction

3.7

rack and pinion hoist

hoist which uses a toothed rack and pinion as the load suspension system

EN 12158-1:2021 (E)**3.8****expanding linkage mechanism**

mechanical linkage system which supports and guides the platform by means of expansion or contraction under the control of an actuator

EXAMPLE Scissors.

3.9**base frame**

lowest framework of the hoist upon which all other components are mounted

3.10**guides**

rigid elements which determine the travel way of the platform

3.11**mast**

structure that supports and guides the platform

3.12**mast section**

indivisible piece of mast, between two adjacent mast joints

3.13**mast tie**

connection system between the mast and any building structure, providing lateral support for the mast

3.14**hoistway**

total space which is travelled by the platform and its load

3.15**platform**

load-carrying device including the floor, sides and entrances

3.16**stopping distance**

distance the platform moves from the moment when the control or safety circuit is broken until the platform has come to a full stop

3.17**overspeed safety device**

mechanical device for stopping and maintaining stationary the platform in the event of overspeed in down direction

3.18**slack rope**

rope, normally under tension, from which all external loads have been removed

3.19**wire rope termination**

adaptation at the end of a wire rope permitting attachment

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3.20**landing**

level in a building or construction intended for loading and unloading the platform

3.21**safety distance**

minimum acceptable distance between any moving part of a hoist and any point of access

3.22**guard rail**

fixed equipment, other than gates, which is used to prevent people from falling or from reaching hazardous areas

3.23**normal operation**

usual operating conditions for the equipment when in use for carrying loads but excluding routine maintenance, erection, dismantling

3.24**in service**

condition during use of the hoist when the platform is in any position, laden or unladen, moving or stationary

3.25**out of service**

installed condition when the unladen platform is positioned such that it is provided with the most shelter from the wind (normally, but not necessarily, on the ground level)

3.26**competent person**

designated person, suitably trained, qualified by knowledge and practical experience, and provided with the necessary instructions to enable the required procedures to be carried out

4 Safety requirements and/or protective/risk reduction measures**4.1 Design considerations**

The design of the hoist shall consider safe use, erection, dismantling and maintenance. It shall be possible to erect the hoist using safe access methods such as those offered by the platform or equivalent facilities.

The design of all components that have to be handled during erection, e.g. mast sections, shall have their weight assessed against manual handling. Where the permissible weight for manual handling is exceeded, the manufacturer shall make available suitable lifting equipment. All removable and detachable covers shall be retained by captive fastenings.

Builders' hoists for goods shall comply with the safety requirements and/or protective measures of this clause. In addition, the machine shall be designed according to the principles of EN ISO 12100:2010 for relevant, but not significant hazards, which are not dealt with by this document (e.g. sharp edges).

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4.2 Load combinations and calculations

4.2.1 General

The structure of the hoist shall be designed and constructed in such a way that its strength is satisfactory under all intended operating conditions, including erection and dismantling and e.g. low temperature environments.

The design of the structure as a whole and each part of it shall be based on the effects of any possible combination of loads as specified in this 4.2. The load combinations shall consider the least favourable locations of the platform and load relative to the mast and its ties, both during the vertical passage of the platform and any horizontal movement, e.g. swivelling of the platform. Ties between the mast and the supporting structure are considered to be part of the hoist structure.

In cases not covered by this document (e.g. where two hoist cars are running on one mast tower or multiple machines are running on one or more mast towers), the load cases may be combined based on state of the art approaches which are taking probabilities of occurrence into consideration.

4.2.2 Calculation of structure

When calculating the hoist structure and every related component, the following forces and loads shall be taken into account:

- a) all dead weights with the exception of the platform and equipment which moves together with the platform;
- b) dead weights of the unladen platform and all equipment which moves together with the platform;
- c) dead weight of landing platforms and gates if supported by the hoist;
- d) rated load on the platform.

The effect of the forces on the platform and mast resulting from the application of the rated load shall be allowed for in one of the two following ways which reflect the chosen density of loading on the platform:

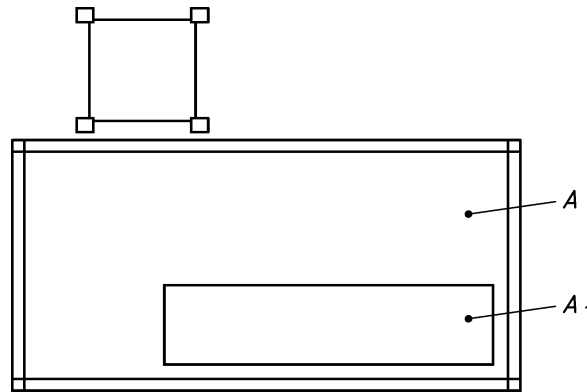
$$1) \text{ if } \frac{m_r}{A \times 0,75} < 300 \text{ kg / m}^2,$$

where

m_r is the rated load [kg] and

A is the total floor area [m²],

the rated load shall be assumed to be distributed over a reduced area (A_1) which results in a distribution of 300 kg/m². The format and the location of this area shall be taken as that which gives the least favourable stress for the mast and also for the platform. One example is shown in Figure 1;

**Key**

- A total floor area [m²]
 $A_1 = m_r/300$ [kg/m²]

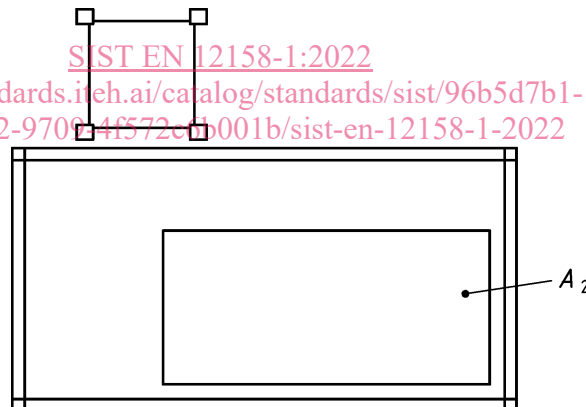
Figure 1 — Example of loading according to 4.2.2 d) 1)

- 2) if $\frac{m_r}{A \times 0,75} \geq 300 \text{ kg/m}^2$

the rated load shall be assumed to be distributed over an area (A_2) equivalent to 75 % of the total floor area of the platform. The format and the location of this area shall be taken as that which gives the least favourable stress for the mast and also for the platform. One example is shown in Figure 2;

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**Key**

- $A_2 = 0,75 A$

Figure 2 — Example of loading according to 4.2.2 d) 2)

- e) where the uniform distribution of the rated load over the full area of the platform is less than 250 kg/m², then for calculation purposes, a minimum of 250 kg/m² shall be placed over the whole area (A_3) of the platform (see Figure 3);