



# SLOVENSKI STANDARD

## SIST EN 12158-2:2002

01-maj-2002

---

### Gradbena dvigala za prevoz materiala - 2. del: Poševna dvigala z nedostopnim sredstvom za prevoz tovora

Builders hoists for goods - Part 2: Inclined hoists with non-accessible load carrying devices

Bauaufzüge für den Materialtransport - Teil 2: Schrägaufzüge mit nicht betretbaren Lastaufnahmemitteln

Monte-matériaux - Partie 2: Elévateurs inclinés a dispositifs porte-charge non accessible

Ta slovenski standard je istoveten z: **EN 12158-2:2000**

#### ICS:

53.020.99      Druga dvigalna oprema      Other lifting equipment

**SIST EN 12158-2:2002**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 12158-2:2002

<https://standards.iteh.ai/catalog/standards/sist/9b6cd5c8-f7fe-4868-abd9-9e532aa71622/sist-en-12158-2-2002>

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 12158-2**

October 2000

ICS 91.140.90

English version

## Builders hoists for goods - Part 2: Inclined hoists with non-accessible load carrying devices

Monte-matériaux - Partie 2: Elévateurs inclinés à dispositifs porte-charge non accessible

Bauaufzüge für den Materialtransport - Teil 2: Schrägaufzüge mit nicht betretbaren Lastaufnahmemitteln

This European Standard was approved by CEN on 9 September 2000.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 12158-2:2002

<https://standards.iteh.ai/catalog/standards/sist/9b6cd5e8-f7fe-4868-abd9-9e532aa71622/sist-en-12158-2-2002>

EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Contents	Page
Foreword .....	3
Introduction .....	3
1 Scope .....	3
2 Normative References .....	5
3 Terms and definitions .....	6
4 List of hazards .....	8
5 Safety requirements and/or measures .....	10
6 Verification .....	25
7 User Information .....	29
Annex A (normative) European stormwind map .....	35
Annex B (informative) Detailed index to this standard .....	36
Annex ZA (informative) Clauses of this European Standard addressing essential requirements or other provisions of EU Directives .....	37
Bibliography .....	38

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 12158-2:2002

<https://standards.iteh.ai/catalog/standards/sist/9b6cd5c8-f7fe-4868-abd9-9e532aa71622/sist-en-12158-2-2002>

## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 10 "Passenger, goods and service lifts", 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 April 2001, and conflicting national standards shall be withdrawn at the latest by April 2001.

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

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

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

## Introduction

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

The standard is a Type C standard relating to safety for builders hoists for goods.

The extent to which hazards are covered is indicated in the scope of this standard. In addition, machinery should comply as appropriate with EN 292 for hazards which are not covered by this standard.

## 1 Scope

**1.1** This standard deals with power operated temporarily installed builders hoists intended for use by persons who are permitted to enter sites of engineering and construction, serving either one upper landing or a work area extending to the end of the guides, (e.g. a roof) having a load carrying device (lcd):

- which is intended for the transportation of goods only;
- where it is forbidden for persons to step upon it at any time;
- which is guided;
- which is designed to travel at an angle of at least 30 degrees to the vertical but may be used at any angle between the vertical and the maximum inclination as specified by the manufacturer;
- which is sustained by steel wire rope and a positive drive system;
- which is controlled by hold-to-run controls by the operator;
- which does not benefit from the use of any counterweight;
- which has a maximum rated load of 300 kg;

- which has a maximum speed of 1,00 m/s;

and where the guides require support from separate structures.

**1.2** The standard identifies hazards as listed in clause 4, which arise during the various phases in the life of such equipment and describes methods for the elimination or reduction of these hazards when used as intended by the manufacturer.

**1.3** This European standard does not specify the additional requirements for:

- 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.

**1.4** This standard is not applicable to

- permanently installed lifts;
- builders hoists for persons and materials;
- builders hoists for the transport of goods with accessible platforms;
- builders hoists with an lcd driven by hydraulic jack (directly or indirectly);
- furniture hoists;
- conveyors;
- work cages suspended from lifting appliances;
- work platforms carried on the forks of fork trucks;
- work platforms;
- funiculars;
- lifts specially designed for military purposes;
- mine lifts;
- theatre elevators;
- special purpose hoists.

**1.5** The safety requirements and/or measures of this standard deal with the design of the base frame, guide rails, lcd, drive unit, electrical and/or hydraulic installation and the control of the hoist. Included is the design of any guide rail support but not the design of the supporting structure (e.g. building or scaffold) and any ties. Other aspects such as base enclosure, the design of any concrete, hard core, timber or other foundation arrangement, hoistway protection and the upper landing are dealt with in the users manual section of this standard.

## 2 Normative References

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions or any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 292-1:1991, *Safety of machinery – Basic concepts, general principles for design – Part 1: Basic terminology, methodology*

EN 292-2:1991+A1: 1995, *Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principals and specifications*

EN 294:1992; *Safety of machinery – Safety distances to prevent danger zones being reached by the upper limbs*

EN 418:1992, *Safety of machinery – Emergency stop equipment, functional aspects – Principles for design*

EN 811, *Safety of machinery – Safety distances to prevent danger zones being reached by the lower limbs*

EN 954-1:1996, *Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design*

EN 982, *Safety requirements for fluid power systems and their components – Hydraulics*

EN 1088:1995, *Safety of machinery – Interlocking devices associated with guards – Principles for design and selection*

EN 60204-32:1998, *Safety of machinery – Electrical equipment of machines – Part 32: Requirements for hoisting machines (IEC 60204-32:1998)*

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

EN 60947-5-1:1997, *Low-voltage switchgear and controlgear – Part 5: Control circuit devices and switching elements – Section 1: Electromechanical control circuit devices (IEC 60947-5-1:1997)*

HD 22.1 S2, *Rubber insulated cables of rated voltage up to and including 450 / 750 volts. Part 1: General requirements*

ISO 2408, *Steel wire ropes for general purposes – Characteristics*

ISO 4302, *Cranes – Wind load Assessment*

ISO 4309, *Cranes – Wire ropes – Code of practice for examination and discard*

### 3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply:

#### 3.1

##### **rated load**

maximum load which the hoist has been designed to carry in service. This load may depend on the configuration of the hoist (i.e. inclination, length of guide rail, load carrying device).

#### 3.2

##### **rated speed**

speed of the lcd for which the equipment has been designed.

#### 3.3

##### **positive drive**

drive using means other than friction.

#### 3.4

##### **rope hoist**

hoist which uses rope as the load suspension system.

#### 3.5

##### **wire rope termination**

adaption at the end of a wire rope permitting attachment.

#### 3.6

##### **check valve**

valve, which allows flow of hydraulic fluid in the desired direction only if a predetermined pressure is maintained at the valve.

#### 3.7

##### **base frame**

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

#### 3.8

##### **chassis**

chassis are base frames which enable road transport of the hoist.

#### 3.9

##### **guide rails**

rigid elements which determine the travel way of the lcd.

#### 3.10

##### **knee section**

guide rail element between two guide rail sections which changes the inclination.

#### 3.11

##### **hoistway**

total space which is travelled by the lcd and its load.

#### 3.12

##### **guide rail section**

indivisible piece of rail, between two adjacent rail joints.

ITeH STANDARD PREVIEW  
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/9b6cd5c8-f7fe-4868-abd9-9e532aa71622/sist-en-12158-2-2002>



**3.13****guide rail support**

connection system between the rail and ground or any building structure, providing support for the rail.

**3.14****load carrying device (lcd)**

part of the hoist which carries the rated load.

**3.15****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.

**3.16****slack rope**

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

**3.17****broken rope device**

device which prevents the lcd from falling in the event of the breaking of the wire rope suspension.

**3.18****landing**

stopping level or work area for loading and unloading the lcd.

**3.19****safety distance**

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

**3.20****normal operation**

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

**3.21****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.

(standards.iteh.ai)

SIST EN 12158-2:2002

<https://standards.iteh.ai/catalog/standards/sist/9b6cd5c8-f7fe-4868-abd9-9e532aa71622/sist-en-12158-2-2002>

## 4 List of hazards

The list of hazards according to the following tables are based on EN 292-1 and EN 292-2:1991 + A1:1995.

Tables 1 and 2 show the hazards which have been identified and where the corresponding requirements have been formulated in this standard, in order to limit the risk or reduce these hazards in each situation.

A hazard which is not applicable or is not significant and for which, therefore, no requirements are formulated, is shown in the relevant clauses column as n.a. (not applicable).

**Table 1 - Hazards relating to the general design and construction of inclined hoists**

	Hazards	Relevant clauses in this standard
<b>1</b>	<b>Mechanical hazards</b>	
1.1	Crushing	5.5.2, 5.6.2, 7.1.2.8
1.2	Shearing	5.6.2, 7.1.2.8
1.3	Cutting or severing	5.5.2, 5.6.2, 7.1.2.8
1.4	Entanglement	5.6.2, 7.1.2.8
1.5	Drawing-in or trapping	5.6.2, 7.1.2.8
1.6	Impact	7.1.2.8
1.7	Stabbing or puncture	n. a.
1.8	Friction or abrasion	5.6.2, 7.1.2.8
1.9	High pressure fluid ejection	5.7
1.10	Ejection of parts	5.5, 5.6.1
1.11	Loss of stability	5.2, 5.3, 5.4, 7.1.2.8
1.12	Slip, trip and fall	5.3.4, 5.5.2
<b>2</b>	<b>Electrical hazards</b>	
2.1	Electrical contact	5.8
2.2	Electrostatic phenomena	n.a.
2.3	Thermal radiation	n.a.
2.4	External influences	5.6.2, 5.6.4.11, 5.8.2
<b>3</b>	<b>Thermal hazards</b>	
3.1	Burns and scalds	n.a.
3.2	Health-damaging effects	n.a.
<b>4</b>	<b>Hazards generated by noise</b>	
4.1	Hearing losses	not dealt with, see 1.3
4.2	Interference with speech	not dealt with, see 1.3
<b>5</b>	<b>Hazards generated by vibration</b>	n.a.
<b>6</b>	<b>Hazards generated by radiation</b>	
6.1	Electrical arcs	n.a.
6.2	Lasers	n.a.
6.3	Ionising radiation sources	n.a.
6.4	Use of H F electromagnetic fields	not dealt with

	Hazards	Relevant clauses in this standard
<b>7</b>	<b>Hazards generated by materials and substances processed, used or exhausted by machinery</b>	
7.1	Contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	n.a.
7.2	Fire or explosion	n.a.
7.3	Biological and microbiological	n.a.
<b>8</b>	<b>Hazards generated by neglecting ergonomic principles in machine design</b>	
8.1	Unhealthy postures or excessive effort	5.1
8.2	Inadequate consideration of human hand/arm or foot/leg anatomy	5.5.1
8.3	Neglected use of personal protection equipment	n.a.
8.4	Inadequate area lighting	7.1.2.8.2
8.5	Mental overload or underload, stress	5.9
8.6	Human error	7.3
<b>9</b>	<b>Hazard combinations</b>	not dealt with
<b>10</b>	<b>Hazards caused by failure of energy supply, breaking down of machinery parts and other functional disorders</b>	
10.1	Failure of energy supply	5.6.4.1, 5.9.5
10.2	Unexpected ejection of machine parts or fluids	5.7.2
10.3	Failure or malfunction of control system	5.8.1, 5.9.3
10.4	Errors of fitting	5.4.3, 5.8.3, 7.1.2.8
10.5	Overturn, unexpected loss of machine stability	5.2, 7.1.2.8
<b>11</b>	<b>Hazards caused by missing and / or incorrectly positioned safety related measures / means</b>	
11.1	Guards	5.5.1, 7.1.2.8.3
11.2	Safety related (protection) devices	7.1.2.8.3
11.3	Starting and stopping devices	5.8.4, 5.9.4, 7.1.2.8
11.4	Safety signs and signals	7.2
11.5	Information or warning devices	7.2, 7.3
11.6	Energy supply disconnecting devices	5.8.1,
11.7	Emergency devices	5.9.3, 5.9.4, 7.1.2.10
11.8	Feeding/removal means of work pieces	n.a.
11.9	Essential equipment and accessories for safe adjusting and/or maintaining	5.9.4.3
11.10	Equipment evacuating gases	n.a., see 1.3

**Table 2 - Particular hazards involving the mobility and / or load lifting ability of hoists**

	Hazards	Relevant clauses in this standard
	<b>Hazards due to mobility</b>	
12	<b>Inadequate lighting of moving / working area</b>	Not dealt with, see 1.3
13	<b>Hazards due to sudden movement instability etc. during handling</b>	Not dealt with, see 1.3
14	<b>Inadequate/non-ergonomic design of operating position</b>	Not dealt with, see 1.3
15	<b>Mechanical hazards</b>	Not dealt with, see 1.3
16	<b>Hazards due to lifting operations</b>	
16.1	Lack of stability	5.1, 5.2, 5.3
16.2	Derailment of load carrying device	5.4
16.3	Loss of mechanical strength of machinery and lifting accessories	5.1, 5.4, 5.6.3
16.4	Hazards caused by uncontrolled movement	5.4, 5.6.4, 5.6.5, 5.8
17	<b>Inadequate view of trajectories of the moving parts</b>	5.8, 7.2
18	<b>Hazards caused by lightning</b>	Not dealt with, see 1.3
19	<b>Hazards due to loading / overloading</b>	5.2, 5.5.1, 7.1.2.9

## 5 Safety requirements and/or measures

### 5.1 General

The design of the hoist shall consider safe use, frequent erection and dismantling as well as maintenance and transportation. At least an ambient temperature range between  $-5^{\circ}\text{C}$  and  $+40^{\circ}\text{C}$  shall be taken into account for correct operation.

The design of all components that have to be handled during erection e.g. guide rail sections, shall have their weight assessed against manual handling. Where the permissible weight for manual handling is exceeded, the manufacturer shall give recommendations in the instruction handbook.

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)

### 5.2 Load combinations and calculations.

**5.2.1** 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 as intended by the manufacturer.

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 5.2. The load combinations shall consider the least favourable locations of the lcd and load relative to the guide rails and its support, both during the passage of the lcd and any movement, e.g. tilting of the lcd. The whole range of possible inclinations, as intended by the manufacturer, shall be considered. The guide rail support is considered to be part of the hoist structure.

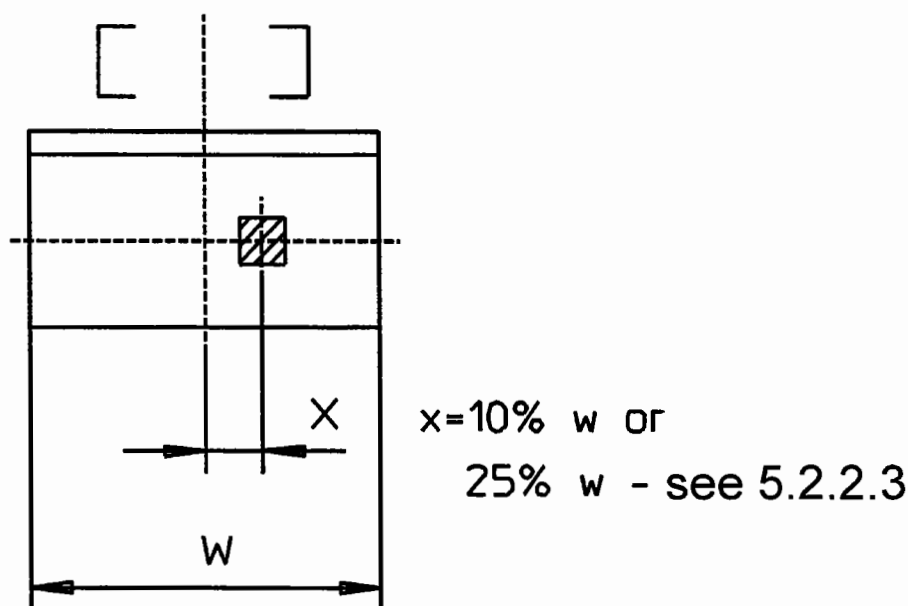
**5.2.2** When calculating the hoist structure and every related component, the following forces and loads shall be taken into account:

**5.2.2.1** All dead weights with exception of the lcd and equipment which moves together with the lcd.

**5.2.2.2** Dead weights of the unladen lcd and all equipment which moves together with the lcd.

**5.2.2.3** Rated load on the lcd.

The rated load shall be considered to act off centre, either side, by an amount which is equivalent to 10 % of the width (W) of the LCD (25 %, when the lcd is intended to be used with overhanging loads) (See Figure 1). Special arrangements for specific materials may need other load configurations.



**Figure 1 - Rated load acting off centre**

**5.2.2.4** For calculation purposes a load of at least 3 kN/m<sup>2</sup> shall be considered as being placed over the area of the lcd, defined as the area, which supports the load at right angles to the guide rails.

**iTeh STANDARD PREVIEW**

**5.2.2.5** Where the hoist is designed such that the lcd is driven against the end of the guide rails before the terminal stopping switch is actuated, it shall be designed to tolerate being driven against the end of the guide rails at rated speed with and without rated load (See also 5.5.1.8). The stalling torque and inertia of the drive system shall be taken into account.

**5.2.2.6** The effect of moving loads shall be determined by taking the weight of all actual loads (lcd, rated load, wire ropes, etc.) and multiplying them by an impact factor  $\mu = (1,1 + 0,264v)$  where  $v$  is the hoisting speed in m/s. Alternative factors may be used if they can be proved to be more accurate.

**5.2.2.7** To determine the forces produced by an operation of the broken rope device, the sum total of the moving load shall be multiplied by the factor 2,5. Alternative factors, but not less than 1,2, may be used if they can be verified under all conditions of loading up to 1,25 times rated load.