SLOVENSKI STANDARD
SIST EN 1551:2002

01-maj-2002

Varnost strojev - Vozila za talni transport - Motorna vozila z nosilnostjo več kot 10000 kg

Safety of industrial trucks - Self propelled trucks over 10 000 kg capacity

Sicherheit von Flurförderzeugen - Kraftbetriebene Flurförderzeuge über 10 000 kg Tragfähigkeit

Sécurité des chariots de manutention - Chariots automoteurs Plus de 10 000 kg

Ta slovenski standard je istoveten z: **EN 1551:2000**

ICS:

53.060	Industrijski tovornjaki	Industrial trucks

SIST EN 1551:2002 **en**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1551

April 2000

ICS 53.060

English version

Safety of industrial trucks - Self propelled trucks over 10 000 kg capacity

Sécurité des chariots de manutention - Chariots automoteurs de plus de 10 000 kg

Sicherheit von Flurförderzeugen - Kraftbetriebene Flurförderzeuge über 10 000 kg Tragfähigkeit

This European Standard was approved by CEN on 16 April 1999.

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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.

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

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

Ref. No. EN 1551:2000 E

Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 150 "Industrial Trucks - Safety", the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by October 2000 conflicting national standards shall be withdrawn at the latest by October 2000.

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.

This European Standard is one of a series of European Standards for the safety of Industrial trucks. The complete series is as follows:

EN 1726, *Safety of Industrial trucks — Self propelled trucks up to and including 10 000 kg capacity and industrial tractors with a drawbar pull up to and including 20 000 N*

EN 1726-1, *Part 1 : General requirements*

EN 1726-2, *Part 2 : Additional requirements for trucks with elevating operator position and trucks specifically designed to travel with elevated loads*

EN 1551, *Safety of Industrial trucks — Self propelled trucks over 10 000 kg capacity*

EN 1459, *Safety of Industrial trucks — Self propelled variable reach trucks*

EN 1757, *Safety of Industrial trucks — Pedestrian propelled trucks*

EN 1757-1, *Part 1 : Stacker trucks*

EN 1757-2, *Part 2 : Pallet trucks*

EN 1757-3, *Part 3 : Platform trucks*

EN 1757-4, *Part 4 : Scissors lift pallet trucks*

EN 1525, *Safety of Industrial trucks — Driverless trucks and their systems*

EN 1526, *Safety of Industrial trucks — Additional requirements for automated functions on trucks*

EN 1175, *Safety of Industrial trucks — Electrical requirements*

EN 1175-1, *Part 1: General requirements for battery powered trucks*

EN 1175-2, *Part 2: General requirements for IC engine powered trucks*

EN 1175-3, *Part 3: Specific requirements for electrical power transmission systems of IC engine powered trucks*

EN 1755, *Safety of Industrial trucks — Operation in potentially explosive atmospheres ; use in flammable gas, vapour, mist and dust.*

EN 12053, *Safety of Industrial trucks — Test methods for measuring noise emissions*

EN ISO 13564, *Safety of Industrial trucks — Test methods for measuring visibility from self propelled trucks*

EN 13059, *Safety of Industrial trucks — Test methods for measuring vibration*

EN 12895, *Safety of Industrial trucks — Electromagnetic compatibility*

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 European Standard is a type C standard as stated in EN 292-1.

This standard has been prepared to be a harmonized standard to provide one means of conforming with the essential safety requirements of the Machinery Directive and associated EFTA regulations.

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

1 Scope

1.1 This standard applies to self propelled lift trucks, the rated capacity of which exceeds 10 000 kg.

This standard does not cover:

— Trucks powered by natural gas.

— Trucks operated by remote control.

— Trucks with elevating operator position.

1.2 For the purposes of this standard, self propelled lift trucks (hereinafter referred to as "trucks") are counterbalanced lift trucks, with masts, as defined in 3.1.3.1.1 of ISO 5053:1987; side loading trucks are defined in 3.1.3.1.7 of ISO 5053:1987 or rough terrain trucks, with masts, as defined in 3.1.3.1.8 of ISO 5053:1987.

1.3 This standard applies to industrial trucks equipped with load handling devices for normal industrial duties, e.g. fork arms or attachments for specified applications. Fork arms and integrated attachments are considered to be parts of the industrial truck.

Attachments mounted on the load carrier or on the fork arms which are removable by the user are not considered to be part of the industrial truck.

For attachments the appropriate clauses of this standard are applicable.

1.4 This European Standard contains the technical requirements to minimize the specific hazards listed in clause 4 which may occur during normal operation and maintenance of the trucks in accordance with the data given by the manufacturer or his authorized representatives.

This European Standard does not cover those requirements to minimize hazards which may occur:

— during construction;

— when handling suspended loads which may swing freely;

— when using trucks on public roads;

— when using a work platform.

This European Standard does not repeat the technical rules which are state of the art and which are applicable to the material used to construct the truck. Reference should be made to EN 292-2.

1.5 Where industrial trucks are required to operate in severe conditions (e.g. in extreme climates, in strong magnetic fields, in potentially explosive atmospheres) special precautions may be necessary. These are not covered in 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 of 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.

EN 281: 1988, *Construction and layout of pedals of self propelled industrial trucks sit down rider controlled*

EN 292-2: 1991, *Safety of Machinery — Basic concepts, general principles of design — Part 1. Basic terminology, methodology*

EN 292-1: 1991, *Safety of Machinery — Basic concepts, general principles of design — Part 2. Technical principles and specifications*

EN 1175-1: 1998, *Safety of industrial trucks — Electrical requirements — Part 1: General requirements for battery powered trucks*

EN 1175-2: 1998, *Safety of industrial trucks — Electrical requirements — Part 2: General requirements for internal combustion engine powered trucks*

EN 1175-3: 1998, *Safety of industrial trucks — Electrical requirements — Part 3: Specific requirements for electrical power transmission systems of internal combustion engine powered trucks*

EN 1526: 1998, *Safety of industrial trucks — Additional requirements for automated functions on trucks*

EN 1755:2000, *Safety of industrial trucks — Operation in potentially explosive atmospheres : Use in flammable gas, vapour mist and dust.*

prEN 12053, *Safety of industrial trucks — Test methods for measuring noise emissions*

prEN ISO 13564, *Safety of industrial trucks — Test methods for measuring visibility from self propelled industrial trucks*

prEN 13059, *Safety of industrial trucks — Test methods for measuring vibration.*

ISO 1074: 1991, *Counterbalanced fork lift trucks — Stability tests*

ISO 2330: 1995, *Fork lift trucks — Fork arms - technical characteristics and testing.*

ISO 2867: 1994, *Earth moving machinery — Access systems*

ISO 3287 : 1999, *Powered industrial trucks — Control symbols*

ISO 3795: 1989, *Road vehicles, and tractors and machinery for agriculture and forestry — Determination of burning behaviour of interior materials*

ISO 3874: 1997, *Series 1 Freight containers - Handling and securing*

ISO 5053: 1987, *Powered industrial trucks — Terminology*

ISO 5767: 1992, *Industrial trucks operating in special conditions of stacking with the mast tilted forward — Additional stability test*

ISO 6055 : 1997, *High lift rider trucks - Overhead guards — Specification and testing*

ISO 6292: 1996, *Powered industrial trucks — Brake performance and component strength*

ISO 10525 : 1997, *Counterbalanced trucks handling freight containers of 6m length and above — Additional stability tests*

ISO 10658: 1996, *Industrial trucks operating in special conditions of stacking with load laterally displaced by powered devices — Additional stability test*

ISO/DIS 15870, *Powered industrial trucks — Safety signs and hazard pictorials – General principles*

3 Definitions

For the purposes of this standard, the definitions of the industrial trucks and their components given in ISO 5053 apply, together with the following.

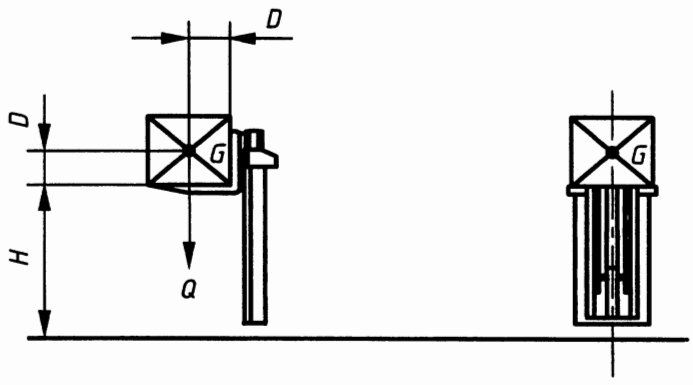
3.1
rated capacity of truck
load in kilograms, given by the manufacturer, that the truck type is capable of transporting or lifting under the following specific conditions

For the load Q the following conditions apply:

— Load centre of gravity G (see Figure 1) positioned at the standard load centre D. (3.3).

— Load Q vertically stacked to the standard lift height (3.2).

— Truck equipped with a double mast where the maximum lift height is equal to the standard lift height. When the truck does not utilize a double mast it shall be given rated capacity on the standard lift height as if the mast were available.



D = standard load centre distance

G = load centre of gravity, positioned in the longitudinal plane of symmetry between the mast uprights

H = standard lift height

Q = rated load

Figure 1

3.2
standard lift height
height H from the ground to the upper face of the fork arm blade, which is 5000 mm for all truck types

3.3
standard load centre distance
distance D for the centre of gravity G of the load measured horizontally to the front face of the fork arm shank and vertically to the upper face of the fork arm blade as specified in 3.3.1 for counterbalanced trucks and 3.3.2 for side loading trucks

3.3.1 Values for distance D are defined in Table 1.

Table 1

Rated load Q, kilograms		Standard load centre distance D, millimetres		
From (included)	To (excluded)	600	900	1200
10 001	20 000	X	X	X
20 000	25 000		X	X
25 000 and above				X
NOTE: Counterbalanced trucks may be rated for special applications with load centre distances related to those applications.				

3.3.2 The distance D for side loading trucks is specified by the manufacturer.

3.4
actual capacity of the truck
the maximum load in kilograms permitted by the manufacturer, that the subject truck is capable of transporting or lifting in normal use (the use for which the truck is designed according to the manufacturer or his authorized representative)

Actual capacity will vary with the different types and heights of mast fitted, changes of fork arms or attachments and different load centre distances used in rating.

Additional actual capacity ratings with removable attachments may also be established where permitted by the appropriate stability specifications.

3.5
rated capacity of removable attachments
maximum load in kilograms, and load centre where applicable, that the attachment is capable of handling in normal operating conditions; as specified by the attachment manufacturer

3.6
operator
any trained person who is responsible for the movement and load handling of the industrial truck

3.7
normal operating position
position in which the operator shall be able to control all functions for driving and load handling. Additional positions may be needed if it is not possible to control all functions of the truck from one position

3.8
forward driving direction and the front end of the truck
the front end of the truck and the forward direction is the end nearest the arrow in Figures 2 and 3

3.8.1
counterbalanced truck

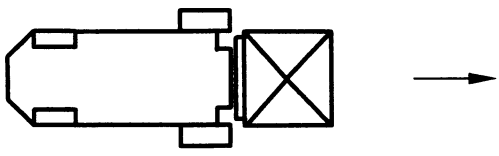


Figure 2

3.8.2
side loading truck

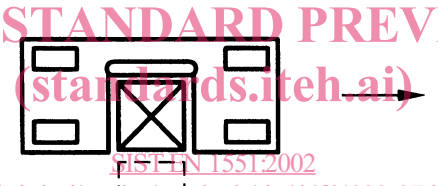


Figure 3

3.9
automatically acting brakes
brakes which are applied in non-operated conditions by stored energy, e.g. spring force, until released by sustained force under control of the operator

The brake system is automatically applied in the event of failure of energy supply to the brake system.

3.10
normal operating conditions
are those described in the stability documents as shown in 5.8.

4 List of hazards

The following hazards from annex A of EN 414:1992 are applicable in the situations described and could invoke risks to persons if not reduced or eliminated. The corresponding requirements are designed to limit the risk or reduce these hazards in each situation.

Hazard		Corresponding requirement	
4.1	Mechanical hazard		
4.1.1	Crushing hazard	5.3	Brakes
		5.4	Controls
		5.5.3	Engine access
		5.7	Operator position
		5.7.4	Protection from road wheels
		5.7.6	Protection against crushing, shearing and trapping
		5.9.1	Operators overhead guard
		5.9.2	Warning device
		5.10.1	Visibility
		5.11.1.1	Cab
		5.11.5	Transport
		7.2.2	Operation of the truck
		7.3.3.4	Warning symbols
4.1.2	Shearing hazards	5.3	Brakes
		5.4	Controls
		5.5.3	Engine access
		5.7	Operator position
		5.7.4	Protection from road wheels
		5.7.6	Protection against crushing, shearing and trapping
		5.9.2	Warning device
		5.10.1	Visibility
		7.2.2	Operation of the truck
		7.3.3.4	Warning symbols
4.1.3	Cutting or severing hazard	5.1.3	Edges or angles
		5.5.3	Engine access
		5.7.6	Protection against crushing, shearing and trapping
4.1.4	Entanglement hazard	5.5.3	Engine access

Hazard		Corresponding requirement	
4.1.5	Drawing in or trapping hazard	5.5.3	Engine access
		5.7.4	Protection from road wheels
		5.7.6	Protection against crushing, shearing and trapping
		5.11.1.6	Operators cab/emergency exit
4.1.6	Impact hazard	5.1.2	Calculation
	- from mechanical failure	5.6.1	Lift chains and wire ropes
		5.6.2	Mechanical lifting system
		5.6.3	Hydraulic lifting and tilting system
		5.6.5	Fork arms
		6.2	Structural verification
		7.2.2	Operation of the truck
	- from unstable loads	5.6.2	Mechanical lifting system
		5.6.3	Hydraulic lifting and tilting system
		5.6.5	Fork arms
		5.6.6	Fork carriers
		5.6.7	Load handling attachments
		5.9.1	Operators overhead guard
		5.9.3	Load backrest
		5.11.1.1	Operators cab
	- from road debris	5.7.4	Protection from road wheels
	- from lifting or transporting a truck	5.11.5	Transport
4.1.7	Stabbing or puncture hazard	5.1.3	Edges or angles
		7.2.5	Service and maintenance of the truck
4.1.8	Friction or abrasion hazard		Not applicable
4.1.9	High pressure fluid ejection	5.1.4	Stored energy components
		5.6.4.1	Hydraulic system
		5.6.4.2	Pressure relief valves
		5.6.7.3	Attachment hydraulic system
		5.6.7.4	Combined hydraulic system
		7.2.2	Operation of the truck

Hazard		Corresponding requirement	
4.1.10	Ejection of parts		See 4.10.2
4.1.11	Loss of stability	5.6.3.4	Hydraulic tilting system
		5.8	Stability
		7.2.2	Operation of the truck
		7.3	Minimum marking
4.1.12	Slip trip and fall hazards	5.7.2	Operator access and egress
		7.2.2	Operation of the truck
4.2	Electrical requirements		
4.2.1	Electrical contact	5.1.1	Electrical requirements
4.2.2	Electrical phenomena	–	Not covered by this standard
4.2.3	Thermal radiation	–	Not applicable
4.2.4	External influences	–	Not covered by this standard
4.3	Thermal hazards		
4.3.1	Burns and scalds	5.5.1	Exhaust system
		5.7.5	Protection from burning
		5.11.1.2	Cab material fire resistance
4.3.2	Severe climate conditions	–	Not covered by this standard
4.4	Hazards generated by noise		
4.4.1	Hearing loss	5.11.2	Noise emission
		7.2.1	Concerning the truck/attachment
		7.2.2	Operation of the truck
4.4.2	Interference with speech	5.11.2	Noise emission
		7.2.1	Concerning the truck/attachment
		7.2.2	Operation of the truck

Hazard		Corresponding requirement	
4.5	Hazards generated by vibration	5.11.3	Vibration
		7.2.1	Concerning the truck/attachment
4.6	Hazards generated by radiation	–	Not covered by this standard
4.7	Hazards generated by materials		
4.7.1	Contact or inhalation	5.5.1	Exhaust system
		5.11.1.3	Totally enclosed cab
		7.2.4	Effect of exhaust emissions
4.7.2	Fire or explosion	5.1.1	Electrical requirements
		5.5.2	Fuel tanks
		5.5.4	LPG requirements
		5.11.1.2	Cab material fire resistance
		7.2.1	Concerning the truck/attachment
4.7.3	Biological and microbiological hazards	–	Not applicable
4.8	Hazards due to neglect of ergonomics		
4.8.1	Unhealthy postures or excess effort	5.7.1	Operator position dimensions
		5.7.2	Operator access and egress
		5.7.3	Seat
		5.9.1.1	Overhead guard headroom
		5.11.1.1	Cab headroom
		7.2.2	Operation of truck
4.8.2	Inadequacy with human anatomy and comfort	5.5.1	Exhaust system
		5.11.1.3	Cab ventilation
		5.11.1.4	Cab heater
		7.2.2	Operation of the truck
4.8.3	Neglected use of personal protection equipment	–	Not applicable
4.8.4	Inadequate local lighting	5.10.2	Truck lighting
4.8.5	Mental overload and underload	–	Not applicable