SLOVENSKI STANDARD
SIST EN 1757-1:2002

01-maj-2002

Varnost vozil za talni transport - Roļ no gnana vozila - 1. del: Skladalniki

Safety of industrial trucks - Pedestrian propelled trucks - Part 1: Stacker trucks

Sicherheit von Flurförderzeugen - Handbetriebene Flurförderzeuge - Teil 1 : Stapler

Sécurité des chariots de manutention - Chariots manuels - Partie 1: Gerbeurs

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ICS:

53.060 Industrijski tovornjaki Industrial trucks

SIST EN 1757-1:2002 **en**

EUROPEAN STANDARD

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EN 1757-1

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English version

Safety of industrial trucks - Pedestrian propelled trucks - Part 1: Stacker trucks

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Sicherheit von Flurförderzeugen - Handbetriebene Flurförderzeuge - Teil 1 : Stapler

This European Standard was approved by CEN on 19 April 2001.

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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 Management Centre has the same status as the official versions.

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

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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of an identical text or by endorsement, at the latest by November 2001, and conflicting national standards shall be withdrawn at the latest by Novemeber 2001.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 EC Directive(s).

For relationship with EC Directive(s), see informative Annex Z, 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. This series of standards includes :

EN 1175 -1	Safety of industrial trucks - Electrical requirements - Part 1 : General requirement for battery powered trucks
EN 1175-2	Safety of industrial trucks - Electrical requirements - Part 2 : General requirements for internal combustion engine powered trucks
EN 1175-3	Safety of industrial trucks - Electrical requirements - Part 3 : Specific requirements for the electrical power transmission systems of internal combustion engine powered trucks
EN 1459	Safety of industrial trucks - Self-propelled variable reach 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 1551	Safety of industrial trucks – Self propelled trucks over 10 000 kg capacity
EN 1726-1	Safety of industrial trucks – Self-propelled trucks up to and including 10 000 kg capacity and industrial tractors with a draw bar pull up to and including 20 000 N - Part 1 : General requirements
EN 1726-2	Safety of industrial trucks – Self-propelled trucks up to and including 10 000 kg capacity and industrial tractors with a draw bar pull up to and including 20 000 N - Part 2 : Additional requirements for trucks with elevating operator position and trucks specifically designed to travel with elevated loads
EN 1755	Safety of industrial trucks - Operation in potentially explosive atmospheres – Use in flammable gas, vapour, mist and dust
EN 1757-1	Safety of industrial trucks - Pedestrian propelled trucks - Part 1 : Stacker trucks
EN 1757-2	Safety of industrial trucks - Pedestrian propelled trucks - Part 2 : Pallet trucks
prEN 1757-3:1997	Safety of industrial trucks - Pedestrian propelled trucks - Part 3 : Platform trucks
prEN 1757-4:1997	Safety of industrial trucks - Pedestrian propelled trucks - Part 4 : Scissor lift pallet trucks
prEN 12053:2000	Safety of industrial trucks - Test methods for measuring noise emissions
EN 12895	Industrial trucks - Electromagnetic compatibility

prEN 13059:1997	Safety of industrial trucks - Test methods for measuring vibration
prEN ISO 13564:1996	Test methods for measuring visibility from self-propelled trucks (ISO/DIS 13564:1996)

The annexes A and B are normative.

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.

0 Introduction

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

This European standard is a type C standard as stated in EN 1070.

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

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.

With the aim of clarifying the intention of the standard and avoiding doubts when reading it, the following assumptions were made when producing it :

- only competent persons operate the machine
- components without specific requirements are designed in accordance with usual engineering practice and calculation code, including all failure modes.

1 Scope

1.1 This standard applies to straddle, pallet and platform pedestrian propelled stacking industrial trucks as defined in 3.1 with capacities not exceeding 1 000 kg, hereinafter referred to as "trucks" equipped with fork arms or platform or other attachment.

This standard applies to trucks provided with either manual or electrical battery powered lifting.

On board battery chargers are part of the truck.

1.2 Attachments and fork arms are not dealt with in this standard.

1.3 This standard deals with the technical requirements to minimise the hazards listed in clause 4 which can arise during commissioning, operation and maintenance of trucks when carried out in accordance with the specifications as intended by the manufacturer.

In addition trucks shall comply, for the hazards not covered by this standard, with the applicable companion standards and as appropriate with EN 292.

1.4 This standard does not establish the additional requirements for :

- operation in severe conditions (e.g. extreme environmental conditions such as : freezer applications, high temperatures, corrosive environment, strong magnetic fields),
- 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/alcalies, radiating materials, specially brittle loads),
- hazards occurring during construction, transportation, decommissioning and disposal,
- hazards occurring when using to handle suspended loads which may swing freely,
- hazards occurring when using on public roads,
- wind pressure in and out of use,
- direct contact with foodstuffs,
- operation on gradients or on surfaces other than smooth, level, hard surfaces,
- winch operated trucks,
- lifting systems using belts,
- lifting of persons,
- trucks with overturning moment greater than 40 000 N m.

1.5 Other possible limitations of the scope of other standards referred to that also apply to this standard.

1.6 Hazards relevant to noise, vibration, visibility and static electricity are not dealt with in this standard.

1.7 This standard applies to trucks manufactured after the date of issue.

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 (including amendments).

EN 292-1 : 1991	Safety of machinery - Basic concepts, general principles for design - Part 1 - Basic terminology, methodology
EN 292-2 : 1991	Safety of machinery - Basic concepts, general principles for design - Part 2 - Technical principles and specifications
EN 1050 : 1996	Safety of machinery - Principles for risk assessment
EN 1175-1	Safety of machinery - Electrical requirements - Part 1 - General requirements for battery powered trucks
EN 1726-1 : 1998	Safety of industrial trucks - Self-propelled trucks up to and including 10 000 kg capacity and industrial tractors with a draw bar pull up to and including 20 000 N - Part 1 - General requirements
ISO 2328	Fork lift trucks - Hook-on type fork arms and fork arm carriages - Mounting dimensions
ISO 2330	Fork lift trucks - Fork arms - Technical characteristics and testing
ISO 15870	Powered industrial trucks - Safety signs and hazard pictorials - General principles
ISO 5053	Powered industrial trucks - Terminology
ISO 10658	Industrial truck operating in special conditions of stacking with load laterally displayed by powered devices - Additional stability test

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply and for the main components, ISO 5053 applies.

3.1
pedestrian propelled stacking truck
truck with a vertical mast without tilt, with load bearing outriggers, equipped with fork arms or platform or other attachment. The truck is designed to be manually pushed, pulled and steered by one pedestrian operator on a smooth, level, hard surface

The load may be raised by either manual means or electrical battery power.

3.1.1
straddle stacker
stacking truck with outriggers, equipped with fork arms which are located between the outriggers

3.1.2
pallet stacker
stacking truck where the fork arms extend over the frame structure

3.1.3
platform stacker
stacking truck with a load platform extending over the frame structure

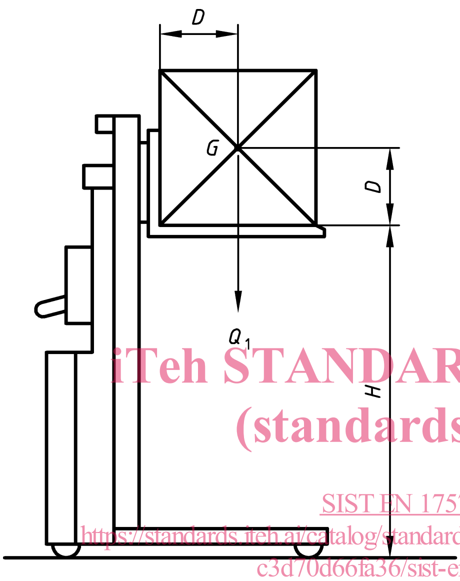
3.2
rated capacity
load in kilograms given by the manufacturer, the truck can lift and transport under the following specific conditions

The rated capacity is defined for a load uniformly distributed and covering entirely the width of the fork arms or platform.

It is equal to the load "Q_1" which the truck type is designed to carry and stack, on fork arms or platform, the maximum lift height of which is equal to the standard lift height "H" (see 3.2.1) and with a standard load centre distance "D" (see 3.2.2).

The centre of gravity “G” shall be on the centre line of the truck.

Where a truck does not lift to the standard lift height "H", it is given a rated capacity at its maximum lift height.



Key

D = Standard load centre distance
G = Centre of gravity
H = Standard lift height
Q_1 = Load

Figure 1 - Rated capacity

3.2.1
standard lift height
height "H" from the ground to the upper face of the fork arms or load platform, as shown in Figure 1 and Table 1

3.2.2
standard load centre distance
distance "D" in millimetres from the centre of gravity "G" of the load measured horizontally to the front face of the fork arms shank and vertically to the upper face of the fork arms, as shown in Figure 1and Table 1

Table 1 - Load centre distance and lift height for rated capacity

Rated capacity Q_1 kg	Standard lift height H m	Standard load centre distance D		
		Straddle Stacker mm	Pallet Stacker mm	Platform Stacker mm
$Q_1 \leq 250$	1,5	250	--	--
$251 < Q_1 \leq 500$	1,5	350/500	600	350
$501 < Q_1 \leq 750$	2,0	500	600	--
$751 < Q_1 \leq 1\,000$	2,5	500	600	350

3.3
actual capacity
maximum load in kilograms (depending on its attachment and elevating height) given by the manufacturer that the subject truck is capable of transporting or lifting under intended operation

Actual capacity will vary with the different types and heights of mast fitted, changes of fork arms or attachments and the different load centre distances (see 3.2.2) used in rating.

Additional actual capacity ratings with attachments may also be established within the range of the appropriate tests.

3.4
rated capacity of removable attachments
maximum load in kilograms and load centre distance, where applicable, given by the manufacturer of the attachment, that the attachment is capable of handling under intended operating conditions as specified by the manufacturer of the attachment

3.5
intended operating position
position in which the operator may control all operational functions as intended by the manufacturer

3.6
intended operation
the use for which the truck is designed according to the manufacturer's handbook

3.7
operator
a designated person, suitably trained (see EN ISO 9001, 4.18) qualified by knowledge and practical experience, and provided with the necessary instructions to enable the required (operation, test and/or examination) to be carried out safely

4 List of hazards

The following hazards from Annex A of EN 1050:1996 are applicable in the situations described and could involve risks to persons if not reduced or eliminated. The corresponding requirements are designed to limit the risk or reduce these hazards in each situation.

Hazards		Corresponding requirements	
4.1	**MECHANICAL HAZARDS**		
4.1.1	Crushing	5.3 5.4 5.5 5.6 5.7 5.8 5.9 5.11 6.2.2 7	Propelling, steering Load handling controls Lifting systems Protection devices Parking brake Stability Protection against crushing, shearing and entanglement points Additional requirements for trucks with battery powered lifting Structural test Information for use
4.1.2	Shearing	5.6.2 5.9 5.10	Glass guards or screens Protection against crushing, shearing and entanglement points Edges and angles
4.1.3	Entanglement	5.6.2 5.9	Glass guards or screens Protection against crushing, shearing and entanglement points
4.1.4	Impact	5.3 5.10 5.11 7	Propelling, steering Edges and angles Additional requirements for trucks with battery powered lifting Information for use
4.1.5	Friction or abrasion	5.3	Propelling, steering
4.1.6	High pressure fluid ejection	5.5.3.4 7	Hydraulic circuit Information for use
4.2	**ELECTRICAL HAZARDS**	5.11	Additional requirements for trucks with battery powered lifting
4.3	**HAZARDS GENERATED BY NEGLECTING ERGONOMIC PRINCIPLES**		
4.3.1	Unhealthy postures or excessive efforts	5.2 5.3 5.4 7	Design and construction forces for truck Propelling, steering Load handling controls Information for use
4.3.2	Inadequate consideration of hand-arm or foot-leg anatomy	5.3 5.4	Propelling, steering Load handling controls
4.3.3	Neglected use of personal protection equipment	7	Information for use
4.3.4	Human error	5.4 5.11.1 7	Load handling controls Lifting Information for use
4.3.5	Inadequate design, location or identification of manual controls	5.3 5.4	Propelling, steering Load handling controls
4.4	**HAZARDS DUE TO FUNCTIONAL DISORDERS**		
4.4.1	Failure of energy supply	5.5.3.6 5.11.2	Failure of energy supply or hydraulic circuit Electrical systems and equipment
4.4.2	Unexpected ejection of machine parts or fluids	5.5.3.4	Hydraulic circuit
4.4.3	Failure of control systems	5.5.3.5	Lowering speed limitation

Hazards		Corresponding requirements
4.5	**HAZARDS DUE TO FAILURES**	5.5 Lifting systems 6.2.2 Structural test 7 Information for use
4.6	**ADDITIONAL HAZARDS DUE TO MOBILITY**	
4.6.1	Insufficient ability of machinery to remain immobilised	5.7 Parking brake 7 Information for use
4.6.2	Contact with the wheels	5.3.2 Tiller 5.6.1 Wheel guards 7 Information for use
4.6.3	Impact hazard	5.10 Edges and angles 7 Information for use
4.7	**ADDITIONAL HAZARDS DUE TO LIFTING**	
4.7.1	Lack of stability	5.8 Stability 7 Information for use
4.7.2	Overload	5.5.3 Hydraulic circuit 7 Information for use
4.7.3	Amplitude of movement	5.5.3 Hydraulic system 5.5.5 Fork carrier 5.5.6 Load handling attachments
4.7.4	Falling of loads	5.5 Lifting system 5.6.3 Load backrest extension 5.8 Stability 7 Information for use
4.8	**HAZARD COMBINATIONS**	Covering each individual hazard is sufficient for covering combinations of hazards