BRITISH STANDARD

BS EN
1726-2:2000

Safety of industrial trucks — Self-propelled trucks up to and including 10 000 kg capacity and tractors with a drawbar 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

The European Standard EN 1726-2:2000 has the status of a British Standard

ICS 53.060

National foreword

This British Standard is the official English language version of EN 1726-2:2000.

The UK participation in its preparation was entrusted to Technical Committee MHE/7, Industrial trucks — Safety, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 29 and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

This British Standard, having been prepared under the direction of the Engineering Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 November 2000

ISBN 0 580 35351 6

Amendments issued since publication

Amd. No.	Date	Comments

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1726-2

September 2000

ICS 53.060

English version

Safety of industrial trucks - Self-propelled trucks up to and including 10 000 kg capacity and tractors with a drawbar 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

Sécurité des chariots de manutention - Chariots automoteurs de capacité n'excédant pas 10 000 kg et tracteurs dont l'effort au crochet est inférieur ou égal à 20 000 N - Partie 2: Dispositions supplémentaires pour les chariots à poste de conduite élevable et les chariots conçus spécialement pour circuler avec la charge en position élevée

Sicherheit von Flurförderzeugen - Motorkraftbetriebene Flurförderzeuge bis einschließlich 10 000 kg Tragfähigkeit und Schlepper bis einschließlich 20 000 N Zugkraft - Teil 2: Zusätzliche Anforderungen für Flurförderzeuge mit hebbarem Fahrerplatz und Flurförderzeuge, die zum Fahren mit angehobener Last gebaut sind

This European Standard was approved by CEN on 9 April 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.

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

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

Ref. No. EN 1726-2:2000 E

CONTENTS

FOREWORD 3
INTRODUCTION 5
1 SCOPE 5
2 NORMATIVE REFERENCES 6
3 TERMS AND DEFINITIONS 6
3.1 OPERATING WITH ELEVATED LOAD 6
3.2 ELEVATING OPERATOR POSITION 6
3.3 GUIDANCE SYSTEM 6
3.4 AISLES 6
3.5 HORIZONTAL DISPLACEMENT 6
4 LIST OF HAZARDS 7
5 REQUIREMENTS 10
5.1 MODES OF OPERATION 10
5.2 BRAKES FOR TRUCKS DESIGNED TO TRAVEL WITH ELEVATED LOADS AND/OR ELEVATING OPERATOR POSITION ..11
5.3 ADDITIONAL REQUIREMENTS FOR TRUCKS WITH ELEVATING OPERATOR POSITION 11
5.4 OPTICAL WARNING DEVICES 15
5.5 STABILITY 15
6 VERIFICATION OF SAFETY REQUIREMENTS AND/OR MEASURES 15
6.1 GENERAL 15
6.2 STRUCTURAL VERIFICATION 15
6.3 FUNCTIONAL VERIFICATION 16
7 INFORMATION FOR USE 16
7.1 INSTRUCTION HANDBOOK, ADDITIONAL REQUIREMENTS TO EN 1726-1 16
7.2 INFORMATION PLATES FOR TRUCKS WITH ELEVATING OPERATOR POSITION 17
7.3 INSTALLATION INFORMATION 17
ANNEX A (NORMATIVE) ORDER PICKING TRUCKS WITH ELEVATING OPERATOR POSITION VERIFICATION OF STABILITY 18
ANNEX B (INFORMATIVE) LOADING CONTROL 28
ANNEX ZA (INFORMATIVE) CLAUSES OF THIS EUROPEAN STANDARD ADDRESSING ESSENTIAL REQUIREMENTS OR OTHER PROVISIONS OF EU DIRECTIVES 29

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 March 2001, and conflicting national standards shall be withdrawn at the latest by March 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.

This European Standard is one of a series of European Standards for the safety of Industrial trucks.

EN 1175-1	Safety of industrial trucks - Part 1: Electrical requirements for battery-powered trucks
EN 1175-2	Safety of industrial trucks - Part 2: Electrical requirements for internal combustion engine powered trucks
EN 1175-3	Safety of industrial trucks - Part 3: Electrical requirements for electrical power transmission systems of internal combustion engine powered trucks
EN 1459	Safety of industrial trucks - Variable reach trucks
EN 1525	Safety of industrial trucks - Driverless industrial trucks and their systems
EN 1526	Safety of industrial trucks - Automated functions for industrial 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 tractors with a drawbar 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 tractors with a drawbar pull up to and including 20 000 N - Part 2: Additional requirements for trucks with elevating operator position and trucks specially designed to travel with elevated load
EN 1755	Safety of industrial trucks - Operation in potentially explosive atmospheres; industrial trucks for use in flammable gas, vapour, mist and dust
prEN 1757-1	Safety of industrial trucks - Pedestrian controlled manual and semi-manual trucks Part 1: Stacker trucks
prEN 1757-2	Safety of industrial trucks - Pedestrian controlled manual and semi-manual trucks Part 2: Pallet trucks with lift height up to 300 mm
prEN 1757-3	Safety of industrial trucks - Pedestrian controlled manual and semi-manual trucks Part 3: Platform trucks
prEN 1757-4	Safety of industrial trucks - Pedestrian controlled manual and semi-manual trucks Part 4: Pallet-trucks with scissors lift
prEN 12053	Safety of industrial trucks - Noise measurement of industrial trucks; sound pressure level at the operator's position and sound power level for the environment
prEN ISO 13564	Safety of industrial trucks - Visibility test method (ISO/DIS 13564 : 1996)
prEN 13059	Safety of industrial trucks - Test method 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 harmonised 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, industrial trucks shall comply as appropriate with EN 292-1 for hazards which are not covered by this standard.

1 SCOPE

1.1 This European Standard is applicable, in addition to EN 1726-1 to industrial trucks designed to travel indoors on smooth level prepared surfaces and equipped with vertical, non tilting mast.

a) with an elevating operator position, as defined in 3.1.3.1.6 and 3.1.3.3 of ISO 5053, where the elevating operator position and the load handling device lifts simultaneously to a height of more than 1 200 mm above ground level

and

b) with a load handling device elevated more than 1 200 mm as defined in 3.1.3.1.10 of ISO 5053

For both types of truck the load handling device can be elevated, lowered or horizontally displaced, laden or unladen, while the truck is travelling.

Trucks can be used in guidance systems, without guidance systems or in both systems, and are not intended to tow or push.

1.2 This European Standard covers the technical requirements necessary to minimise the specific hazards listed in clause 4 which could occur during normal operation and maintenance (in accordance with the data given by the manufacturer or his authorised representative) of industrial trucks.

This European Standard does not cover those requirements to minimise 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 fitted to a truck not specifically designed to elevate persons
- when using trucks see 1.1 with tiltable mast.

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

1.3 This European Standard applies to industrial trucks equipped with load handling devices for normal industrial duties, e.g. fork arms and platforms, or attachments for specified applications. Fork arms, load platforms 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 Where industrial trucks are required to operate in severe conditions (e.g. in extreme climates, in freezer applications, strong magnetic fields) special precautions may be necessary. These are not covered by this standard.

1.5 For trucks with elevating operator position up to and including 1 200 mm and/or trucks especially designed to travel with elevated load up to and including 1 200 mm the requirements of EN 1726-1 apply.

2 NORMATIVE REFERENCES

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

EN 292-1: 1991	Safety of machinery - Basic concepts - General principles for design Part 1: Basic terminology, methodology
EN 292-2: 1991/ A2: 1997	Safety of machinery - Basic concepts - General principles for design Part 2: Technical principles and specifications
EN 341: 1992	Personal protective equipment against falls from a height - Descender devices
EN 574: 1996	Safety of machinery - Two-hand control devices – Functional aspects – Principles for design
EN 954-1: 1996	Safety of machinery – Safety related parts of control systems – General principles for design
EN 1050: 1996	Safety of machinery - Principles for risk assessment
EN 1175-1:1998	Safety of Industrial trucks – Electrical requirements – General requirements for battery powered trucks
EN 1526:1997	Safety of Industrial trucks - Additional requirements for automated functions on trucks
EN 1726-1:1998	Safety of Industrial trucks - Self-propelled trucks up to and including 10 000 kg capacity and tractors with a drawbar pull up to and including 20 000 N – Part 1 : General requirements
ISO 2860: 1992	Earth-moving machinery – Minimum access dimensions
ISO 5053: 1987	Powered industrial trucks - Terminology
ISO 6292:1996	Powered industrial trucks and tractors - Brake performance and component strength

3 TERMS AND DEFINITIONS

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

3.1 Operating with elevated load

The load handling device is designed to be elevated, lowered or horizontally displaced at more than 1 200 mm above ground level whilst the truck is travelling, laden or unladen.

3.2 Elevating operator position

Normal operating position which can be elevated more than 1 200 mm from ground level to the floor of the operator platform, truck.

3.3 Guidance system

The system which guides the truck on a predetermined path by external means not directly controlled by the operator.

3.4 Aisles

The operating area of the truck between the racks.

Note: Aisles can be so designed and dimensioned to accept entry of free ranging trucks or trucks operating with guidance systems.

3.5 Horizontal Displacement

Any horizontal, lateral, reach or rotational movement of the load handling device in relation to the truck or any combination of these movements.

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.

	Hazard		Corresponding requirement
4.1	Mechanical hazards		
4.1.1	Crushing hazard	5.2	Brakes
		5.3.2	Brakes
		5.3.3	Controls
		5.3.5	Operator position
		5.3.6	Protective devices
		5.4	Optical warning devices
		7.1	Instruction handbook
		7.2	Information plates
		7.3.2	Safety clearance
4.1.2	Shearing hazard	5.2	Brakes
		5.3.2	Brakes
		5.3.3	Controls
		5.3.5	Operator position
		5.4	Optical warning device
		7.1	Instruction handbook
		7.3	Installation information
4.1.3	Cutting or severing hazard	-	Not covered by this standard
4.1.4	Entanglement hazard	-	Not covered by this standard
4.1.5	Drawing-in or trapping hazard	5.3.3.3	Two hand control
4.1.6	Impact hazard		
	- from mechanical failure	5.3.4	Systems for lifting and lowering
		6.2	Structural verification
		7.1.2	Operation of the truck
	- from unstable loads	5.3.4	Systems for lifting and lowering
		5.3.6	Protective devices
	- from road debris	-	Not covered by this standard
	- from lifting or transporting a truck	-	Not covered by this standard
4.1.7	Stabbing or puncture hazard	-	Not covered by this standard
4.1.8	Friction or abrasion hazard	-	Not applicable
4.1.9	High pressure fluid ejection	-	Not covered by this standard
4.1.10	Ejection of parts	-	see 4.10.2
4.1.11	Loss of stability	5.1	Modes of operation
		5.5	Stability
		7.1.2	Operation of the truck
		7.3	Installation information
4.1.12	Slip, trip and fall hazards	5.3.5	Operator position
		5.3.7	Emergency egress
		7.1	Instruction handbook
4.2	Electrical hazards		
4.2.1	Electrical contact	-	Not covered by this standard
4.2.2	Electrostatic phenomena	-	Not covered by this standard
4.2.3	Thermal radiation	-	Not applicable
4.2.4	External influences	-	Not covered by this standard

	Hazard		Corresponding requirement
4.3	Thermal hazards		
4.3.1	Burns and scalds	-	Not covered by this standard
4.3.2	Severe climatic conditions	-	Not covered by this standard
4.4	Hazards generated by noise		
4.4.1	Hearing loss	-	Not covered by this standard
4.4.2	Interference with speech	-	Not covered by this standard
4.5	Hazards generated by vibration	-	Not covered by this standard
4.6	Hazards generated by radiation	-	Not covered by this standard
4.7	Hazards generated by materials		
4.7.1	Contact or inhalation	-	Not covered by this standard
4.7.2	Fire or explosion	-	Not covered by this standard
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	-	Not covered by this standard
4.8.2	Inadequacy with human anatomy & comfort	-	Not covered by this standard
4.8.3	Neglected use of personal protection equipment	-	Not applicable
4.8.4	Inadequate local lighting	-	Not covered by this standard
4.8.5	Mental overload or underload	-	Not applicable
4.8.6	Human errors	7.1 7.2	Instruction handbook Information plates
4.9	Hazard combinations	-	Not applicable
4.10	Hazards due to functional disorders		
4.10.1	Failure of energy supply	5.3.2	Brakes
4.10.2	Ejection of parts	-	Not applicable
4.10.3	Failure of control system	5.2 5.3.4 5.3.6.2	Brakes Systems for lifting and lowering Emergency lowering control
4.10.4	Errors of fitting	-	Not covered by this standard
4.10.5	Loss of machinery stability	-	see 4.1.11
4.11	Hazards due to missing safety means	-	Not applicable
Additional hazards due to mobility			
4.12	Inadequate lighting of moving/working area		see 4.8.4

	Hazard		Corresponding requirement
4.13	Hazards due to sudden movement, instability etc. during handling	7.1	Instruction handbook
4.14	Inadequate/inergonomic design of driving/operating position		
4.14.1	Hazards due to dangerous environments (contact with moving parts, exhaust gases etc.)	5.3.3.3 5.3.5	Two hand control Operator position
4.14.2	Inadequate visibility from operator's position - on pedestrian-controlled trucks	- -	Not covered by this standard Not applicable
4.14.3	Inadequate seat/seating	-	Not covered by this standard
4.14.4	Inadequate ergonomic design/ positioning of controls	-	Not covered by this standard
4.14.5	Starting/moving of self-propelled machinery - Layout of pedals - Additional operator positions	 - 5.3.3.2	 Not covered by this standard Additional operator positions
4.14.6	Road traffic of self-propelled machinery	-	Not covered by this standard
4.14.7	Movement of pedestrian-controlled machinery	-	Not applicable
4.15	Mechanical hazards		
4.15.1	Hazards to exposed persons due to uncontrolled movement	5.3.3.3 5.3.4.2 5.3.4.5	Two hand control Hydraulic lifting systems Slack wire ropes/chains
4.15.2	Hazards due to break-up and/or ejection of parts	-	Not applicable
4.15.3	Hazards due to rolling over (deflection limiting volume; DLV)	-	Not applicable
4.15.4	Hazards due to falling objects (DLV)	5.3.6.1	Overhead guard
4.15.5	Inadequate means of access	-	Not covered by this standard
4.15.6	Hazards caused due to towing, coupling connecting, transmission etc.	-	Not covered by this standard
4.15.7	Hazards due to batteries, fire, emissions etc.	-	Not covered by this standard
	Additional hazards due to lifting operation		
4.16.1	Lack of stability	-	see 4.1.11
4.16.2	Derailment of machinery	-	Not applicable
4.16.3	Loss of mechanical strength of machinery and lifting accessories	5.3.4 5.3.4.4 5.3.6.2 6.1 6.2 7.1.3	Systems for lifting and lowering Ropes/chains employed Emergency lowering control Verification, General Structural verification Service and maintenance of the truck

	Hazard		Corresponding requirement
4.16.4	Hazards caused by uncontrolled movement	5.2 5.3.4	Brakes Systems for lifting and lowering
4.17	Inadequate view of trajectories of the moving parts	-	Not covered by this standard
4.18	Hazards caused by lightning	-	Not applicable
4.19	Hazards due to loading/overloading	5.5 6.1 7.1.3	Stability Verification, General Service and maintenance of the truck
4.20	Hazards due to pressure vessels	-	Not covered by this standard

5 REQUIREMENTS

5.1 Modes of operation

5.1.1 Trucks free ranging outside the stacking aisles or in aisles without guidance systems designed to travel with elevated load and/or elevating operator position shall:

a) be automatically prevented from travelling above 4 km/h when the operator position and/or the load handling device is elevated more than 1 200 mm up to and including 3 000 mm above the ground level and the steered wheel(s) is turned to not more than 10 degrees from a straight ahead position. The travelling speed is restricted to not more than 2,5 km/h at these elevations when the steered wheel(s) is turned to more than 10 degrees from a straight ahead position (see Table 1). The deceleration of the travelling speed shall be gradual.

b) have travel speed restricted to not more than 2,5 km/h when the operating position and/or the load handling device is elevated more than 3 000 mm above the ground level (see Table 1).

5.1.2 Guided trucks operating in aisles with a non mechanical guidance system shall comply with the automatic steering requirements of EN 1526.

5.1.3 Whilst the truck is lifting, lowering or travelling at more than 2,5 km/h, it shall not be possible for any part of the lateral reach mechanism to intrude into the racking space. When this lateral reach mechanism is extended or extending, travelling speed shall be restricted to 2,5 km/h.

5.1.4 When a truck is designed for lateral and front stacking it shall have a device which automatically prevents:

a) travelling at more than 2,5 km/h when the load handling device is in the forward position;

b) turning of the load handling device in its forward position with a travelling speed of more than 2,5 km/h.

These requirements do not apply when the stability of the truck is maintained by the means described in 5.5.3.

5.2 Brakes for trucks designed to travel with elevated loads and/or elevating operator position

5.2.1 For operations without guidance systems with the operator position or load handling device not more than 1 200 mm above ground level, the braking capacity shall comply with the requirements of ISO 6292, group A1. Alternatively the travel speed shall be automatically reduced to not more than 9 km/h and braking capacity shall comply with ISO 6292 group C (see Table 1).

5.2.2 For operation within guided systems, the braking capacity shall comply with ISO 6292 group C.

5.3 Additional requirements for trucks with elevating operator position

5.3.1 Travel speed

Trucks shall be so designed that their travel speed does not exceed 16 km/h (see Table 1).

5.3.2 Brakes

Automatically acting brakes shall be provided. This brake can be service as well as parking brake (see EN 1726-1).

Table 1 : Braking capacity related to modes of operation

Operating	without guidance						with guidance	
Clause	5.1.1 a)		5.1.1 b)	5.2.1	5.2.1	5.2.1	5.2.2	5.2.2
Speed v in km/h with rated load. The maximum speed of 16 km/h applies to trucks with elevating operator position.	≤ 2,5	> 2,5 ≤ 4	≤ 2,5	> 4 ≤ 9	> 9 ≤ 13,4	> 13,4 ≤ 16	≤ 9	> 9 ≤ 16
Height above ground level in mm for operator position and/or load handling device	> 1 200 ≤ 3 000	> 1 200 ≤ 3 000 or limited by stability	> 3 000 limited by stability only	≤ 1 200	≤ 1 200	≤ 1 200	limited by stability only	limited by stability only
Steering in degrees	unlimited	Maximum ± 10	unlimited	unlimited	unlimited	unlimited	guided	guided
Minimum braking capacity c_b in %	min. 4	Min. 4	min.4	1,0 v min. 4	1,86 v	25	1,0 v min. 4	9
Group of ISO 6292	C	C	C	C	A1	A1	C	C

5.3.3 Controls

5.3.3.1 Controls for lifting and lowering operation shall be arranged at the elevating operator-platform. It shall not be possible to move the platform and/or the truck unless the operator is at the operator position.

5.3.3.2 Where two operator positions are embodied, one on the elevating section and one on the fixed section, it shall not be possible to actuate the fixed section controls when the elevating section controls are operable. However, the emergency lowering requirements specified in 5.3.6.2 are still applicable.

The fixed section shall be located clear of the area occupied by the elevating section control position when lowered.

5.3.3.3 Means shall be provided to safeguard the operator(s) against injuries due to contact with objects outside of the operator's position during movement of the machine. For this purpose a two-hand control device type 1 of EN 574 or means giving equivalent safety may be used if the truck is used guided in aisles. Any additional person on board the truck shall be similarly protected.

5.3.3.4 When a truck with an elevating operator position is fitted with more than one operating position a lockable switch or other means, e.g. magnetic card, code system, shall be provided to activate the controls for each operating position, protected as specified in 5.3.3.3.

5.3.3.5 Transmission of operator control between the operator position and the actuators shall be designed giving special consideration to possibility of a failure in the transmission system.

5.3.4 Systems for lifting and lowering

5.3.4.1 Mechanical lifting systems

The ropes/chains employed in the operator elevating system shall conform to 5.3.4.4 to 5.3.4.6.

5.3.4.2 Hydraulic lifting systems

A device shall be provided which prevents descent in the event of a pipe fracturing or a hose bursting. This device shall be either directly attached to or incorporated in the lift cylinder. It shall not be possible to disengage this mechanism unless the rate of descent is limited to 0,4 m/s.

5.3.4.3 Combined lifting systems

Combined lifting systems shall comply with the requirements of 5.3.4.2 and 5.3.4.4 to 5.3.4.6.

5.3.4.4 Ropes/chains employed in operator elevating systems

a) Where ropes or chains are used for elevating/lowering the operating position at least two identical ropes/chains independently anchored are to be employed.

b) Means shall be provided (e. g. adjustment) to equalise the loading of chains or ropes used for elevating and lowering the operator position. It shall be possible to inspect the chains or wire ropes over their entire length, without dismantling more than covers or guards.

c) As a deviation of EN 1726-1 the safety factor for chains shall be at least 10 and for wire ropes at least 12.

d) Wire rope grips shall not be used for rope terminations for load carrying ropes. The strength of every rope/chain termination shall be at least 80 % of the certified minimum breaking load of the rope or chain.

5.3.4.5 Where the operator elevating mechanism employs wire ropes or chains, slack wire rope or chain detection devices shall be fitted which detect no chain/rope tension. Slack wire rope or slack chain shall automatically stop the downward motion of the elevating mechanism of the operating position.

5.3.4.6 The elevating mechanism shall be arranged to prevent wire ropes becoming entangled, twisted and displaced.

5.3.4.7 In the event of breakage of a chain or a wire rope employed in the operating mechanism the arrangement of the chain(s) or wire-rope(s) and their anchorage's remaining in use is maintained without bringing about any deformation of the basic components of the truck. The failure of a chain or wire rope shall be detected and shall not lead to the operator position falling and shall stop automatically all lifting or lowering functions of the operator position.

5.3.4.8 Means shall also be provided to prevent the operator's position being accidentally disengaged from the lifting mechanism over the complete range of its movements.

5.3.5 Operator position

5.3.5.1 Operator's platforms shall comply with the requirements of EN 1726-1.

5.3.5.2 Gates, doors, etc. shall not be capable of opening outwards or downwards. The gates, doors, etc. shall have a means, e.g. electrical interlocking, that prevents travelling, elevating or lowering movements when the gates, doors, etc. are not correctly closed. If a trapdoor in the floor is used, it must have the dimensions specified in ISO 2860 and shall only open upwards.

5.3.5.3 For trucks with an elevating operator position intended by the manufacturer to be used with a defined pallet as walking surface (disposable pallets are not allowed), means , which are part of the truck, shall be provided to prevent overturning or shifting of the pallet (see 7.1.2). If no pallet is in place, a mechanical guard as specified in 5.3.5.1 and 5.3.5.2 shall be in place between the operator's platform and the load handling device.,

5.3.5.4 For trucks specified in 5.3.5.3 the side guard rails specified in 5.3.5.1 shall be fixed and extended to encompass the whole of the area accessible to the operator (and assistant if permitted by the design). In addition, a rail is required between the operator position and pallet.

NOTE : This rail should meet the requiremetns of 5.3.5.1 but need not be fitted with an intermediate rail or toe board.

5.3.5.5 Where the enclosure of the operator position is such that the operator could become trapped, the doors shall be designed to facilitate release from the outside or an alternative means of egress/access, such as a trap door, shall be provided.

5.3.5.6 The floor of the operator position shall be horizontal and slip resistant, e.g. ribbed mats, abrasive coating, expanded metal.

a) It shall be capable of withstanding a pressure of 1 500 N/m^2 and a mass of 100 kg uniformly distributed over any area of 0,16 m^2 at any part of its surface.

Note: Depending on material used and the platform floor design configuration, it may be necessary to verify for local stresses and deformation. In this case the recommended surface to be used is 0,2m x 0,2m.

b) Where the floor is provided with glazing, it shall be of equivalent strength to the floor or be protected to a standard equivalent to the floor. The glass shall be of safety type, e.g. toughened glass, laminated glass. Alternatively plastic may be used.

c) Where grated flooring is used, the holes or openings shall not allow a 20 mm diameter sphere to pass through. The section of each opening shall in no case exceed 400 mm^2.

5.3.5.7 Where the sides of the operator 's platform are fitted with glazing it shall be toughened or laminated safety glass. The protection specified in 5.3.5.1 shall be extended across the glazing as appropriate.

5.3.6 Protective devices

5.3.6.1 The overhead guard shall comply with the requirements of EN 1726-1.

5.3.6.2 Trucks designed to elevate the operator more than 3 000 mm above ground level shall be fitted with an emergency lowering control, operable from ground level whose function is to return the elevating operator position to ground level, even in the absence of any energy source. The rate of descent is limited to 0,4m/s. The control position shall be carefully selected so as to avoid any risk to the person who is operating from this position.

5.3.7 Emergency egress

Trucks that are designed to elevate the operator position more than 3 000 mm above ground level shall be provided with means , e.g. descender devices complying with EN 341 Class C, rope-ladder, etc., by which the operator can reach the ground safely in the event of the operator position becoming fixed in the elevated position. Plain ropes or knotted ropes and similar shall not be used.

5.4 Optical warning devices

Trucks with an operator position designed to elevate more than 3 000 mm above ground level shall be fitted with an optical warning device. The warning device shall flash and be visible from ground level when the operator position is being lowered and/or when the truck is travelling.

5.5 Stability

5.5.1 Order picking trucks with elevating operator position shall comply with Annex A. Stability of lateral and front stacking trucks shall comply with Annex G of EN 1726-1 : 1998.

5.5.2 Where truck stability depends on reduction of speed and/or braking at a certain lift height (or heights) operation beyond those limits shall be automatically prevented.

5.5.3 When trucks operating in the aisles are wholly or partly prevented from tipover by means of external supports, e.g. by truck rollers running in restraining rails fitted to the racking, the special stability tests for operation in the aisles should only be carried out in the directions in which the truck is not protected against overturning. If the operator position and/or load handling device is elevated disengagement from or leaving these supports shall be prevented, e.g. automatic stop.

6 VERIFICATION OF SAFETY REQUIREMENTS AND/OR MEASURES

6.1 General

The manufacturer shall verify that the requirements of clause 5 have been met. Compliance with this requirement may be verified by other means giving equivalent results.

6.1.1 Mode of verification

The verifications are as follows:

- Visually e. g. no permanent deformation after structural verification and verification of marking of the truck.
- By measures e. g. all tests of travelling speed and lifting speed.
- By design e. g. for verification of drawings and documents.
- Further tests e. g. as described in 6.2 and 6.3.

6.1.2 Verification for trucks with elevating operator position

For means provided in 5.3.4.4 b) the manufacture shall verify that the adjustment of chains/ropes are sufficient to contain the design limits of chains/ropes, taking into account the method given in the information for use (see also 7.1.3).

6.2 Structural verification

6.2.1 General

These tests are to be performed on a sample which is representative of series production.

6.2.2 Structural test

The structural components of the truck with elevating operator position and its attachments shall be able to support for 15 minutes the following test loads: 1,5 Q_1 and 1,5 Q_2.

Q_1 = rated capacity at the standard lift height and standard load centre distance in accordance with the information on the capacity plate

Q_2 = actual capacity at the maximum lift height in accordance with the information on the capacity plate

The truck shall be on substantially level ground with the mast in the substantially vertical position and may be anchored to prevent tipover.

The loads may be applied at the corresponding height by means independent of the truck. The test shall not result in any visual permanent deformation or damage.

The structural components of the truck without elevating operator position shall comply with the requirements of EN 1726-1.

6.3 Functional verification

In addition to the functional verification in EN 1726-1 the following verification shall be covered:

- Mode of operation as appropriate in 5.1;
- Action of controls (5.3.3, 5.3.6.2);
- Slack chain or wire rope detection (5.3.4.5);
- Function of gates/doors closure (5.3.5.2);
- Function of pallet detection (5.3.5.3);
- Automatic prevention of speed/braking (5.5.2).

7 INFORMATION FOR USE

7.1 Instruction handbook, additional requirements to EN 1726-1

7.1.1 Concerning the truck

- Information about possibility of egress and means by which the operator can reach the ground safely in the event of the operator position becoming fixed in the elevated position.
- Information about using multiple manning devices.

7.1.2 Operation of the truck

- Information on how to operate the truck if the stops according to 5.3.4.5 and 5.3.4.7 have occurred;
- Instruction for operation with or without guidance systems;
- Instruction for operation with a specific number of persons;
- Instruction for operation with the emergency lowering control;
- Instruction on the use of the means of emergency egress;
- Information about risks to the operator when exceeding the limits of the operator platform;
- Information about pallets which can be used as a walking surface as described in 5.3.5.3 and their fixing means;
- Information about lighting of the working area;
- Restriction concerning towing, pushing and abnormal use.

7.1.3 Service and maintenance of the truck

- Type and frequency of inspection and maintenance/adjustment operations of the loading of each chain or rope.

- Information for braking adjustment

7.2 Information plates for trucks with elevating operator position

- Trucks shall be marked legibly and indelibly with the number of persons permitted on the operator's platform while the truck is in use.

- Information about renewing marks and labels.

7.3 Installation information

7.3.1 The manufacturer shall provide the user with dimensional tolerances for the floor, clearance requirements for racking and details of other interfacing equipment.

7.3.2 The truck manufacturer shall state to the user that for trucks operating in aisles with guidance systems, there shall be a designed safety clearance of 90 mm minimum at each side of the truck between the operator's platform and the racking or the load in its properly stacking position.

7.3.3 Information on safety procedures to ensure that trucks with guidance systems can be operated safely in racking systems, e.g. simultaneous use of several trucks in one aisle.

ANNEX A (NORMATIVE)

ORDER PICKING TRUCKS WITH ELEVATING OPERATOR POSITION

VERIFICATION OF STABILITY

A.1 SCOPE

This annex specifies the basic tests for the verification of stability of order picking trucks with elevating operator position. This annex applies to trucks fitted with fork arms and/or attachments. They do not apply to trucks fitted with a load carrier that can be shifted laterally or pivoted out of the longitudinal centre plane of the truck.

A.2 CONDITIONS OF VALIDITY

This annex applies to order picking trucks with elevating operator position where the operator's position can be raised to elevations greater than 1 200 mm with or on the load carrier. They may be designed to be guided, free ranging, or both.

When guided these requirements apply to trucks:

a) that are not restrained from the tipover by external means;

b) that are partly restrained from the tipover by external means;

c) operating with the load centre of gravity approximately on the longitudinal centre plane of the truck and;

d) operating (travelling and stacking) on a substantially firm, smooth level and prepared surface.

Truck types in b) shall be tested to these requirements to verify the stability in those modes in which they are not restrained.

Trucks, when guided, may have the operator's position and/or the load carrier re-positioned or operated whilst travelling, provided the appropriate conditions and safety requirements and the stability requirements are fully satisfied.

The following stability tests ensure that the type of truck specified has satisfactory stability when reasonably and appropriately used under normal operating conditions.

When the truck is used under conditions differing from normal, reference shall also be made to annexes H, J and K of EN 1726-1 : 1998.

A.2.1 Normal operating conditions

A.2.1.1 Normal operation guided within aisles

Guided operation is considered normal if a truck is:

a) operated with the load or load handling device at a height at which traction speed is not restricted below the maximum for which the truck is capable;

b) operated with the load or load handling device elevated up to a height at which traction of the truck is still allowed, possibly at reduced speed and with correspondingly reduced braking;

c) operated when picking, placing, stacking or retrieving at any height up to the maximum. Traction at these heights may be totally inhibited or limited to max. 2,5 km/h.

A.2.1.2 Normal operation when free ranging (unguided)

Free ranging operation is considered normal if a truck is:

a) operated at speeds up to v_o (see figure A.33) with the load or load handling device lowered (1 200 mm maximum). The drawbar drag F exerted by the brakes, if not at conventional truck level shall either be restored

to the level associated with conventional trucks or the speed v_o shall be automatically restricted to not more than 9 km/h.

b) operated at speeds not more than 4 km/h with the load or load handling device elevated over 1 200 mm but not more than 3 000 mm, with the steering not more than ± 10 degrees from the substantially straight ahead position. Traction other than max. 2,5 km/h shall be automatically prevented when the steering departs more than ± 10 degrees from the substantially straight ahead position.

c) used for picking, placing, stacking or retrieving up to a lift height authorised by the manufacturer. Traction shall be limited to max. 2,5 km/h.

A.3 TEST CONDITIONS

A.3.1 Test procedures

Stability of these trucks shall be verified by means of the tests described below.

A.3.1.1 Tilting platform

A test platform which can be tilted about one side shall be used.

A truck being tested for stability is placed on the initially horizontal test platform, in the conditions specified in A.3.2 and, successively, in each of the positions described in the table A.2.

In each of these tests, the test platform shall be tilted slowly to the slope indicated in the table A2. The truck is considered stable if it passes all tests without overturning.

For the purpose of these tests, overturning is defined as test platform slope value which, if increased, would cause overturning of the truck.

It is permissible in lateral tests for one of the load wheels to lose contact with the test platform, and it is acceptable for parts of the structure or other designed features to make contact with the test platform.

A.3.1.2 Fixed slope

Fixed slopes with inclinations equivalent to the prescribed test slope shall be used. The slope surface shall be smooth and capable of supporting the truck mass without deformation likely to affect the test results. The truck under test conforming to the conditions shall be driven onto the fixed slopes with the mast lowered and positioned according to the table A.2. For each of the laden truck positions, the load shall be elevated slowly and smoothly to the height indicated in the table.

A.3.1.3 Calculation

Compliance with the specified stability values may be determined by calculation methods verified by empirical data. Such calculated capacities shall allow for manufacturing variations and deflections of mast, tyres, etc.

A.3.2 Conditions for the truck

A.3.2.1 General

The tests shall be carried out with the truck ready for use without operator. Fuel tanks on engined trucks shall be filled to a level corresponding to the least stable condition, all other tanks shall be filled to their correct operating levels. The load carrying means shall be fully equipped with any protective or supplementary lifting apparatus supplied as original equipment.

Where applicable, tyres shall be inflated to the pressures specified by the manufacturer, and where tyre ballast is permitted it shall be used in accordance with the manufacturer's instructions.

A.3.2.2 Lift height for tests simulating travelling

For tests simulating travelling, the upper face of the load platform or fork arms at the heels shall be positioned in accordance with the safety features embodied and the mode of travel being simulated.

A.3.2.3 Lift height for tests simulating stacking

For tests simulating stacking, the lift height shall be measured between the surface of the tilting platform and the upper surface of the fork blade near the inside heel.

A.3.3 Effect of the operator's weight on stability

The operator shall be represented by a weight (mass) of 90 kg if the stability during a test is thereby decreased. For a standing operator, the weight (mass) shall be secured with its centre of gravity 1 000 mm above the centre of the footplate at the control position. For a seated operator the weight (mass) shall be secured with its centre of gravity 250 mm above the operator's seat in a compressed condition.

A.3.4 Location of the truck on the test platform

The specified position of the truck on the test platform shall be maintained during each test. Wheel rotation shall be prevented by application of the handbrake, or service brakes, which may be secured in the 'on' position. Additionally, the wheels may be wedged against the truck frame but in such a way that any axle/frame articulation is not affected. However, as a safety measure when testing longitudinally with the articulating axle parallel and nearer to the tilt axis of the test platform, the articulation of the axle may be locked/blocked.

It is permissible to use chocks or blocks between the wheels and the test platform to prevent the truck sliding out of position. The height of the chocks or blocks shall not exceed the values indicated in table A.1.

Table A.1

Outside diameter (d) of the wheel	Maximum height of chocks or blocks
Up to 250 mm	25 mm
over 250 mm	0,1 d

A.3.5 Test load

The test load shall be a weight (mass) equivalent to the rated load Q acting through a centre of gravity G, normally positioned at the standard load centre distance D, horizontally from the front face of the fork arm shank and vertically from the upper face of the fork arm blade.

The centre of gravity G shall be on the centre plane between the mast uprights (see figure A.1).

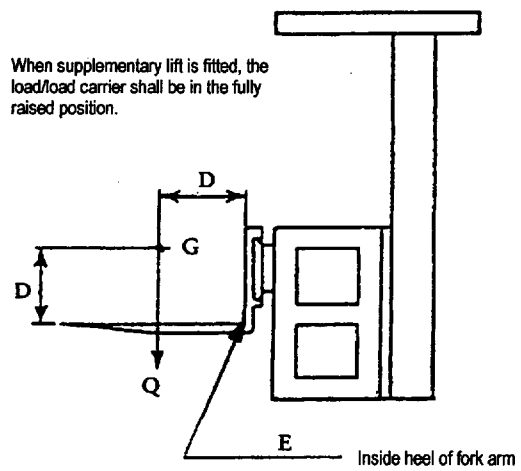


Figure A.1 Position of the centre of gravity

If the manufacturer shows other possible ratings on the capacity plate, tests shall be carried out with maximum load at the corresponding height as well as with the load corresponding to the maximum height.

A.3.6 Safety precautions

Precautions shall be taken to prevent the overturning of the truck or the displacement of the test load during the tests. Where lashings are used to prevent the truck overturning, they shall be sufficiently supple and arranged with sufficient slack so that no appreciable restriction is imposed on the truck until the overturning movement starts.

Displacement of the test load may be prevented by means such as:

a) firmly securing to the load carrier,

b) suspending near the ground by a rope, chain etc., in such a manner that the upper end of the suspension means acts at the point G where the centre of gravity of a fixed test load would otherwise be located.

A.4 TEST PROCEDURE

The truck shall be positioned in accordance with table A.2.

Lateral tests shall be conducted to the side which is least stable with a line through points MN of the truck parallel to the tilting axis XY of the platform.

The truck wheel positions and general truck configurations in the diagrams are representative only and other arrangements are permissible provided the general principles relating to the test position are maintained.

A.5 TESTS FOR TRUCKS FITTED WITH ATTACHMENTS

Trucks fitted with attachments shall be subjected to the foregoing stability tests.

The test load and its position shall be those specified on the capacity plate(s) of the truck fitted with the attachment and used in compliance with the instructions of the manufacturer.

The lift heights required in the tests shall be measured between the surface of the tilting platform and the underside of the load or attachment, whichever is the smaller.

Table A.2

Tests for longitudinal stability when operating guided within the aisles		
Test No	1	2
Test of stability when	Travelling	Travelling
Test load	With	Without
Load centre distance	D of test load	-
Lift height	Maximum for unrestricted travelling (see A.2.1.1 a))	Maximum for unrestricted travelling (see A.2.1.1 a))
Position on test platform	Figures A.2 and A.3 or A.5 and A.6 (position of least stability)	Figures A.4 and A.3 or A.7 and A.6 (position of least stability)
Test platform slope	When H ≤ 500 mm and V max > 9 km/h: slope = 18% When H ≤ 500 mm and V max ≤ 9 km/h: slope = 1,3F% ([1]) When H > 500 mm: slope = 1,3F% ([1])	See figure A.32

([1]) F = actual drawbar drag exerted by the brakes (in %), or tractive effort expressed as a percentage of the gross weight (mass) of the truck, with or without load, as applicable.

AB = longitudinal centre plane of truck

XY = test platform tilt axis

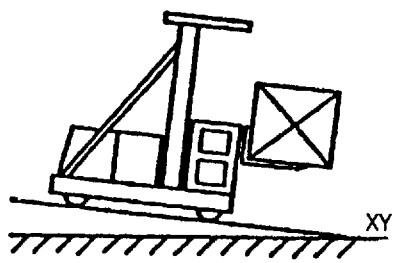


Figure A.2

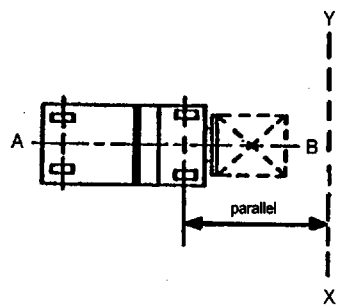


Figure A.3

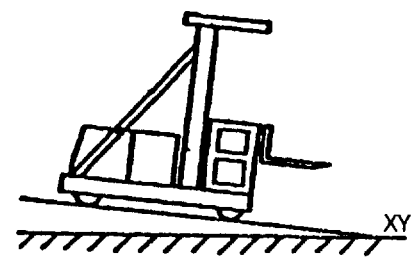


Figure A.4

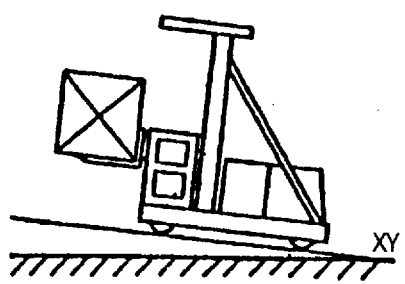


Figure A.5

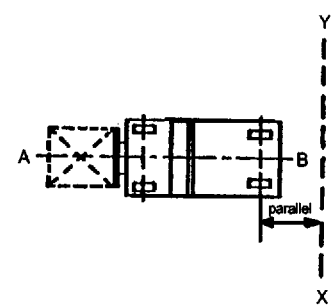


Figure A.6

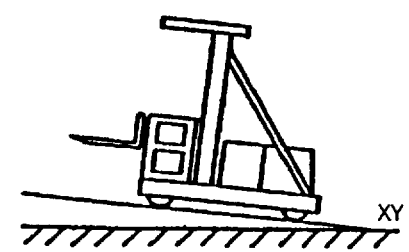


Figure A.7

Table A.2 (continued)

Tests for longitudinal stability when operating guided within the aisles			
Test No	3	4	5
Test of stability when	Travelling	Travelling	Travelling
Test load	With	With	Without
Load centre distance	D of test load	D of test load	-
Lift height	Maximum for travelling (see A.2.1.1 b))	Maximum for travelling (see A.2.1.1 b))	Maximum for travelling (see A.2.1.1 b))
Position on test platform	Figures A.8 and A.3	Figures A.9 and A.6	Figures A.10 and A.3 or A.11 and A.6 (position of least stability)
Test platform slope	1,3 F% ([1])	1,3 F% ([1])	1,3 F (unladen) % ([1])

([1]) F = actual drawbar drag exerted by the brakes (in %), or tractive effort expressed as a percentage of the gross weight (mass) of the truck, with or without load, as applicable.

XY = test platform tilt axis

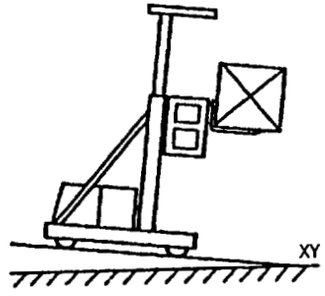


Figure A.8

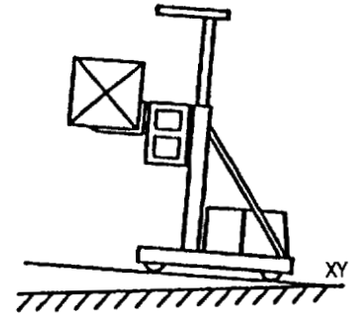


Figure A.9

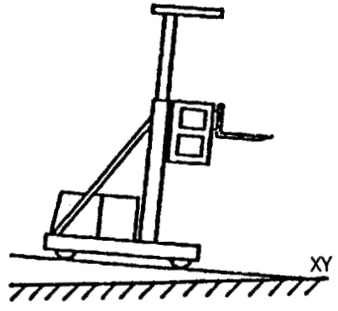


Figure A.10

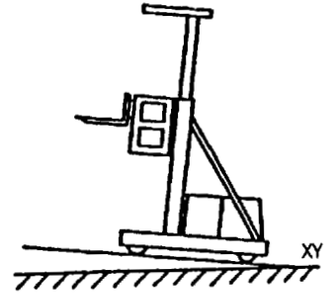


Figure A.11

Table A.2 (continued)

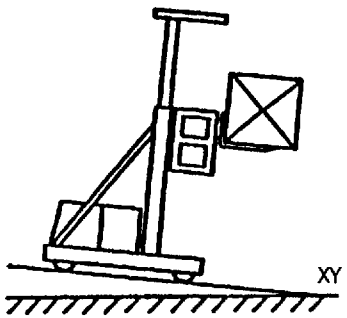
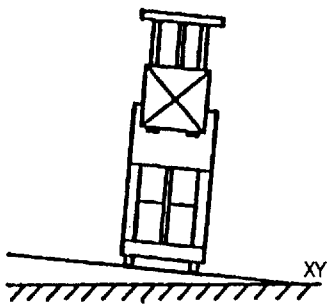
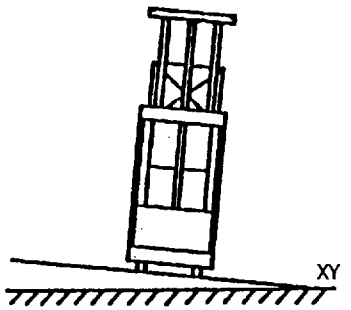
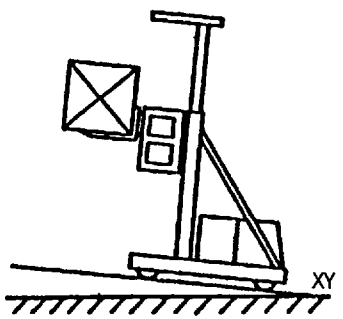
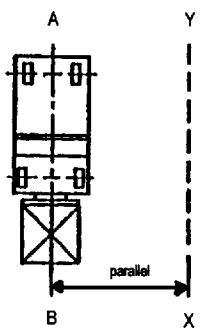
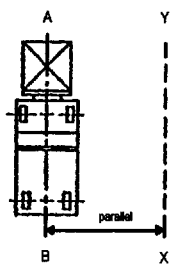
Tests for stability when operating guided within the aisles	
Test No	6
Test of stability when	Picking/Placing or Stacking/Retrieving
Test load	With
Load centre distance	D of test load
Lift height	Maximum (see A.2.1.1 c))
Position on test platform	Figures A.12 and A.3, A.13 and A.16, A.14 and A.17 or A.15 and A.6 (position of least stability)
Test platform slope	4% when traction at maximum height is totally inhibited 6% when traction at maximum height is not totally inhibited
AB = longitudinal centre line of truck XY = test platform tilt axis	 Figure A.12  Figure A.13  Figure A.14  Figure A.15  Figure A.16  Figure A.17

Table A.2 (continued)

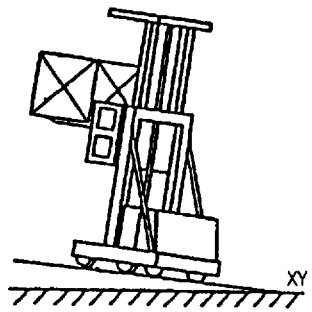
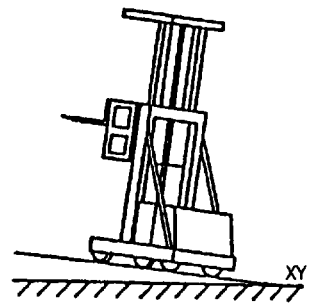
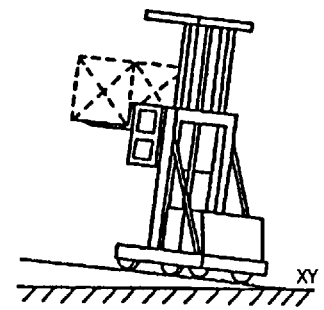
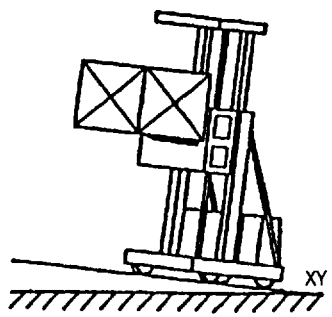
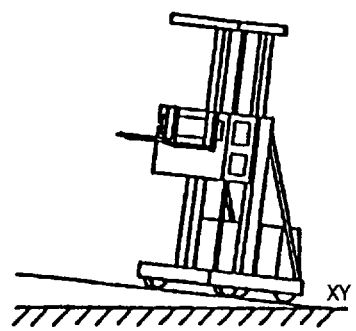
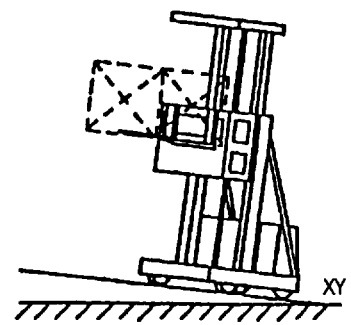
Tests for lateral stability when operating free ranging (unguided)			
Test No	7	8	9
Test of stability when	Picking/Placing or Stacking/Retrieving	Picking/Placing or Stacking/Retrieving	Turning
Test load	With	Without	With or Without (condition of least stability)
Load centre distance	D of test load	-	D of test load
Lift height	Maximum see (A.2.1.2 c))	Maximum see (A.2.1.2 c))	Maximum see (A.2.1.2 a))
Position on test platform	Figures A.18 or A.21 and A.24 to A.31, as applicable (position of least stability)	Figures A.19 or A.22 and A.24 to A.31, as applicable (position of least stability)	Figures A.20 or A.23 to A24 to A.31, as applicable (position of least stability)
Test platform slope	6%	8%	See figure A.33
XY = test platform tilt axis	 Figure A.18	 Figure A.19	 Figure A.20
	 Figure A.21	 Figure A.22	 Figure A.23

Table A.2 (concluded)

Position of truck on platform for tests 7, 8 and 9

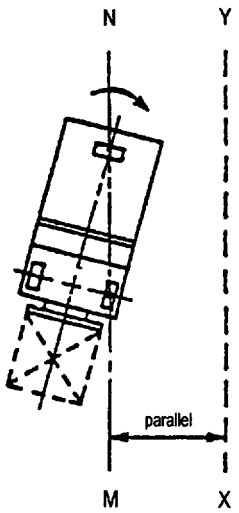


Figure A.24

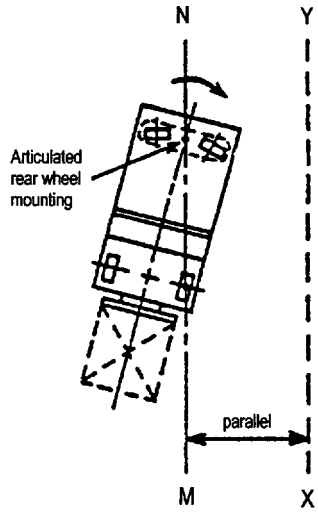


Figure A.25

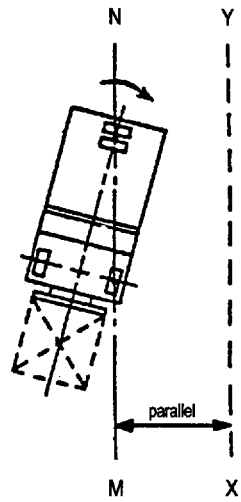


Figure A.26

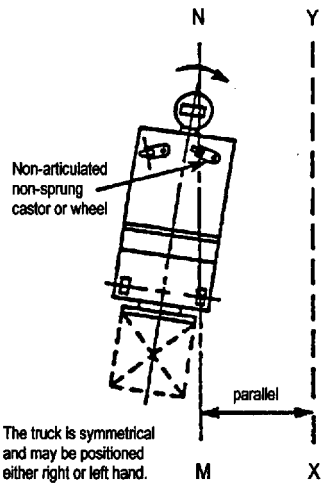


Figure A.27

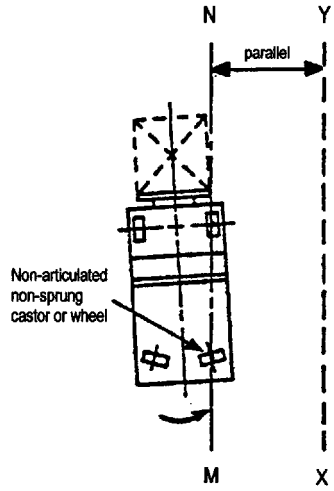


Figure A.28

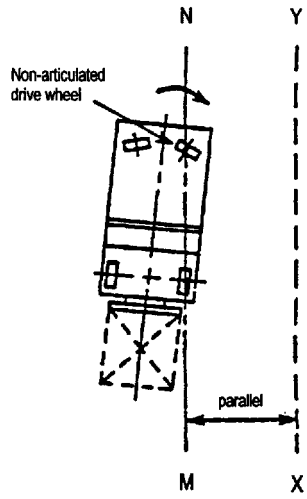


Figure A.29

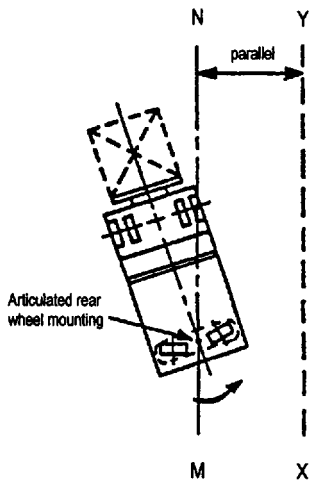


Figure A.30

MN = truck axis of original tilt

XY = test platform tilt axis

Arrow = motion represented

Note

The truck wheel positions and general truck configurations in the diagrams are representative only and other arrangements are permissible provided the general principles relating to the test position are maintained.

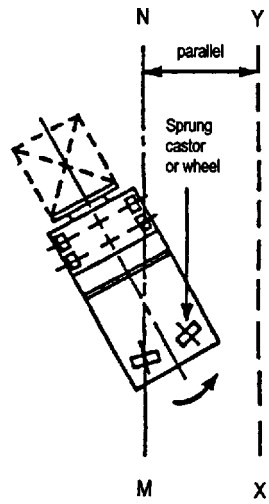
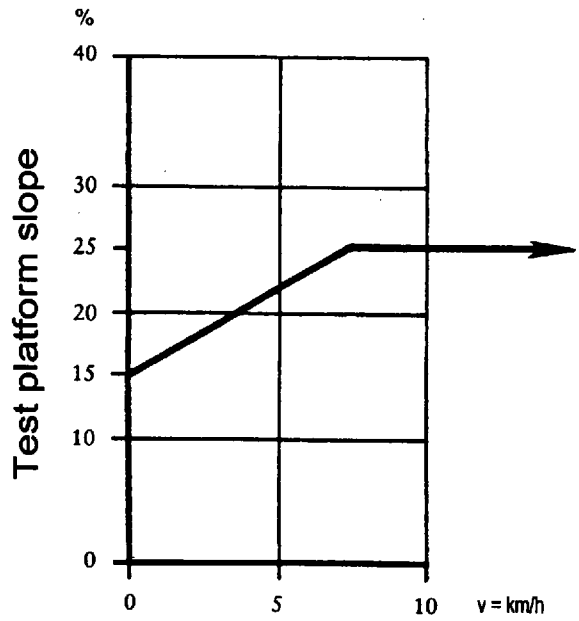


Figure A.31

Test No 2

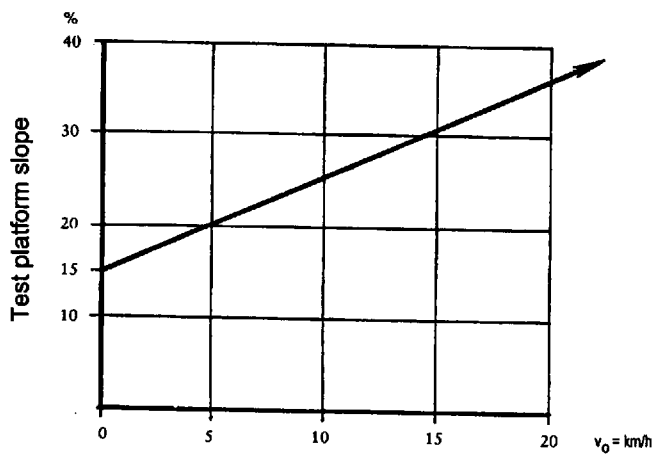


(15+1,55v)%→max.25%

v = maximum speed of truck in the operating aisles, in kilometres per our, unladen, on smooth and level ground

Figure A.32

Test No 9



(15+1,1v_0)%

v_0 = maximum speed of truck attainable outside the aisles, in kilometres per hour, unladen, on smooth and level ground (this may be automatically reduced from v which is the maximum speed of truck in the operating aisles)

Figure A.33

ANNEX B (INFORMATIVE)

LOADING CONTROL

Annex N of EN 1726-1 : 1998 gives specific information about the loading control.

In addition, Annex B gives further information on a possible use of loading control for trucks with elevated operator position and trucks designed to travel with elevated load.

The information hereunder shows that the use of loading control system does not lead to higher safety conditions, does not effect the safety of the truck and is not state of the art.

Trucks included in the scope of this standard are designed to operate to more stringent performance criteria than those covered by EN 1726-1, e.g.:

- For unguided trucks speed is automatically reduced at specified lifting heights as follows:

  ⇒ travel at full speed (16 km/h maximum) only when the operator position is raised ≤ 1200 mm from the ground.

  ⇒ Speed is automatically reduced to 4 km/h when the operator position is raised between > 1200 mm and ≤ 3000 mm (at these lift heights speed is further reduced to 2,5 km/h when steering is turned to more than ± 10 degrees).

  ⇒ Speed is further automatically reduced to 2,5 km/h (creep speed) under all circumstances, at lift heights > 3000 mm.

Reducing speed cuts the risk of tipover when the operator is elevated.

- Guided and unguided trucks covered by this standard have stability test requirements related to maximum speeds and actual braking force (see Table 1 and 5.2.2).

- Electrical / electronic systems are designed to comply with safety related control categories according to EN 954-1 for speed control, speed reductions at lift heights and steering systems, see 5.9.4, 5.9.6, 5.9.9 and 5.9.10 of EN 1175-1 : 1998.

- Overloading for lateral and front stacking trucks is prevented by the system design where the weight and dimensions of palletised loads are directly related to the truck capacity (and are part of the system rack/truck).

- For order picking trucks with elevating operator position when in elevated position external overloading can not be prevented by overloading system.

- Trucks with elevated operator position are designed with a vertical mast (no tilting forward possible).

- The safety factors for ropes or chains used in industrial trucks with elevated operator position are higher than requested by the Machinery Directive

ANNEX ZA (INFORMATIVE)

CLAUSES OF THIS EUROPEAN STANDARD ADDRESSING ESSENTIAL REQUIREMENTS OR OTHER PROVISIONS OF EU DIRECTIVES

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 98/37/EC.

Warning: Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

The clauses of this standard are likely to support requirements of Directive 98/37/EC.

Compliance with this standard provides one means of conforming with the specific essential requirements of the Directive concerned and associated EFTA regulations.

BS EN 1726-2:2000

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: 020 8996 9000. Fax: 020 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: 020 8996 9001. Fax: 020 8996 7001.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: 020 8996 7111. Fax: 020 8996 7048.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: 020 8996 7002. Fax: 020 8996 7001.

Copyright

BSI
389 Chiswick High Road
London
W4 4AL