SLOVENSKI STANDARD

SIST EN 1726-1:1999

01-junij-1999

Varnost strojev - Vozila za talni transport - Motorna vozila z nosilnostjo do vkljuļ no 10000 kg in vleļ na vozila z vleļ no silo do vkljuļ no 20000 N

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 - Part 1: General requirements

Sicherheit von Flurförderzeugen - Motorkraftbetriebene Flurförderzeuge bis einschließlich 10 000 kg Tragfähigkeit und Schlepper bis einschließlich 20 000 N Zugkraft - Teil 1: Allgemeine Anforderungen

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 a 20 000 N - Partie 1: Prescriptions générales

Ta slovenski standard je istoveten z: **EN 1726-1:1998**

ICS:

53.060	Industrijski tovornjaki	Industrial trucks

SIST EN 1726-1:1999 **en**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1726-1

November 1998

ICS 53.060

Descriptors: industrial trucks, self-propelled machines, safety of machines, accident prevention, definitions, hazards, specifications, protection, safety devices, verification, tests, stability tests, information, utilization, technical notices, marking

English version

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 - Part 1: General requirements

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This European Standard was approved by CEN on 30 October 1998.

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

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 May 1999, and conflicting national standards shall be withdrawn at the latest by May 1999.

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 - Electrical requirements - Part 1: General requirements 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 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 industrial 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 tractors with a drawbar pull 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 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
EN 1757-3	Safety of industrial trucks - Pedestrian propelled trucks - Part 3: Platform trucks
EN 1757-4	Safety of industrial trucks - Pedestrian propelled trucks - Part 4: Scissor lift pallet trucks
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.

0 INTRODUCTION

This European Standard is a type C standard as stated in EN 292-1:1991. 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, industrial trucks shall comply as appropriate with EN 292-1:1991 for hazards which are not covered by this standard.

1 SCOPE

1.1 This European Standard applies to self-propelled industrial trucks including masted rough terrain trucks (see 3.1.3.1.8 of ISO 5053:1987) with removable and integrated attachments with a rated capacity up to and including 10 000 kg and to tractors with a rated drawbar pull up to and including 20 000 N.

This European Standard does not apply to:

- non-stacking low-lift straddle carriers (3.1.3.2.3 of ISO 5053:1987)
- stacking high-lift straddle carriers (3.1.3.1.11 of ISO 5053:1987)
- trucks powered by natural gas
- single-axle industrial trucks

1.2 A self-propelled industrial truck (hereinafter generally referred to as a truck) is any wheeled vehicle - except one running on rails - designed to carry, tow, push, lift, stack or tier in racks any kind of load and is controlled by an operator who either walks with the truck or rides on a seat or on a specially arranged platform.
A pedestrian controlled industrial truck (see 3.4.2 of ISO 5053:1987) with a stand-on option, is a pedestrian controlled industrial truck for the purposes of this standard.
A stand-on industrial truck (see 3.4.1.2 of ISO 5053:1987) with an auxiliary seat for the operator is considered to be a stand-on industrial trucks for the purposes of this standard.

1.3 This European Standard covers the technical requirements necessary to minimise the specific hazards listed in 4 which could occur during normal operation and maintenance (in accordance with the data given by the manufacturer or their 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

This European Standard does not repeat all the 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 292-2:1995.

1.4 This European Standard applies to industrial trucks equipped with load handling devices for normal industrial duties, e. g. fork arms or 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.

1.5 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.

1.6 For trucks with elevating driver position of more than 1 200 mm and/or trucks especially designed to travel with elevated load of more than 1 200 mm the additional requirements of prEN 1726-2 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 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-controls
EN 292-1:1991	Safety of machinery - Basic concepts - General principles for design Part 1: Basic terminology, methodology
EN 292-2:1995	Safety of machinery - Basic concepts - General principles for design Part 2: Technical principles and specifications
EN 954-1	Safety of machinery Safety related parts of control systems Part 1: General principles for design
EN 1175-1	Safety of industrial trucks - Electrical requirements - Part 1: General requirements 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 electrical power transmission systems of internal combustion engine powered trucks
prEN 1526	Safety of industrial trucks Additional requirements for automated functions on trucks
prEN 1726-2	Safety of industrial trucks - Self propelled trucks up to and including 10 000 kg capacity and tractors with a drawbar pull including 20 000 N Part 2: Additional requirements for trucks with elevating operator position and trucks specifically designed to travel with elevated loads
prEN 1755	Safety of industrial trucks Operation in potentially explosive atmospheres: use in flammable gas, vapour, mist and dust
prEN 1757-1	Safety of industrial trucks - Pedestrian propelled trucks - Part 1:Stacker trucks
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 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 - Safety requirements - Access systems
ISO/DIS 3184.2	Reach and straddle fork-lift trucks - Stability tests
ISO/DIS 3287	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 5053:1987	Powered industrial trucks - Terminology, Bilingual edition
ISO 5766:1990	Pallet stackers and high-lift platform trucks - Stability tests
ISO 5767:1992	Industrial trucks operating in special conditions of stacking with mast tilted forward - Additional stability tests
ISO 6055	High-lift rider trucks - Overhead guards - Specification and testing
ISO 6292:1996	Powered industrial trucks - Brake performance and component strength
ISO 10525	Counterbalanced trucks handling freight containers of 6 m (20 ft) length and above - Additional stability tests
ISO 10658:1996	Industrial trucks operating in special conditions of stacking with load offset by powered devices - Additional stability tests

3 DEFINITIONS

For the purpose of this standard the definitions of the industrial trucks and their components given in ISO 5053:1987 apply together with the following:

3.1 Operator

Any trained person who is responsible for the movement and load handling of the industrial truck. The operator may be transported by the industrial truck, or may be on foot accompanying the truck or may be remote from the truck (cables, radio etc.)

3.2 Normal operating position

Position in which the operator shall be able to control all functions for driving and load handling.

3.3 Low-lift height

Lifting height providing sufficient ground clearance for horizontal transport of loads up to and including 500 mm.

Note: Non stacking

3.4 Automatically acting brakes

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

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

3.5 Normal operating conditions

Normal operating conditions are those described in the stability documents as shown in 5.8. The following applies to trucks for which stability tests are not specified:

a) driving (travelling and lifting) on substantially firm, smooth, level and prepared surfaces
b) driving with the load centre of gravity approximately on the longitudinal centre plane of the truck
c) travelling with the mast or fork arms tilted backwards, where applicable, and the load in the lowered (travelling) position

Note to a)

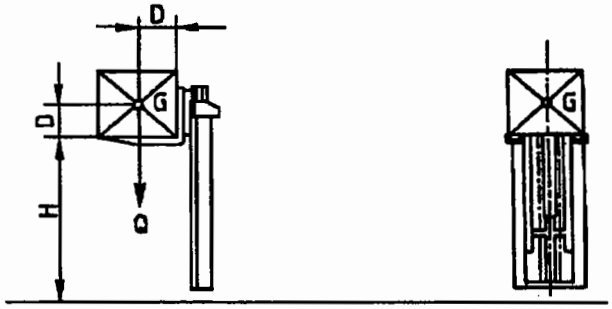
The precise floor conditions differ with the type of truck, e.g. a reach truck with small solid tyres requires a smoother and more level floor than a counterbalanced truck with larger pneumatic tyres. The floor conditions on which the type of truck is designed to operate shall be specified in the instruction manual, (see 7.2.2).

3.6 Rated capacity

3.6.1 Rated capacity of high lift trucks

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) position in the standard load centre distance D (3.9)
- Load Q vertical stacked to the standard lift height (3.8)
- Trucks equipped with a double mast where the maximum lift height is equal to the standard lift height. When the truck does not utilise a double mast it shall be given a 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

3.6.2 Rated capacity of trucks with low lift height

The rated capacity is the maximum load in kilograms permitted by the manufacturer and uniformly distributed over the load carrying platform or device, that the truck is capable of transporting and lifting under normal use. The rated capacity is equal to the actual capacity.

Note: This applies also to trucks with fixed-platforms.

3.6.3 Rated capacity of removable attachments

The maximum load in kilograms and load centre distance, where appropriate, that the attachment is capable of handling in normal operation under conditions specified by the attachment manufacturer.

3.7 Actual capacity

The maximum load in kilograms depending on lift height, load centre and attachments, permitted by the manufacturer that the subject truck is capable of transporting or lifting in normal use (the use for which a truck is designed according to the manufacturer or his authorised representative).
Actual capacity may vary with the different types and heights of mast fitted, and the different standard load centre distances (3.9) used in rating.
Additional actual capacity ratings with removable attachments may also be established where permitted by the appropriate stability tests.

3.8 Standard lift height

Height H in millimeter measured from the ground to the upper face of the fork blades or lifting platform. These heights are standardised as follows:

H = 2 500 mm for pallet stackers and high-lift platform trucks having a width across fork arms or platform up to and including 690 mm
H = 3 300 mm for all other types of truck

3.9 Standard load centre distance

Distance D in millimetres measured horizontally and vertically between the centre of gravity of the load G and the front face of the fork shank and the upper face of the fork blade (Figure 1).
The standard load centre distances are:

- for counterbalanced trucks as specified in Table 1.

Table 1

Rated load Q in kg		Standard load centre distance D in mm		
from	up to and not including	400	500	600
0	1000	X		
1000	5000		X	
5000	10001			X

- for single side-loading trucks and lateral and front stacking trucks as specified by the manufacturer.
- for trucks for special applications in relation to the application.
- for all other trucks 600 mm.

3.10 Rated drawbar pull of tractors

The horizontal drawbar pull at the coupling in Newtons given by the manufacturer, that the industrial tractor can develop at a specified coupling height whilst travelling on a smooth, dry and horizontal concrete surface:

- for tractors powered by an internal combustion engine, whilst moving at a uniform speed of not less than 10 % of the rated no-load speed and
- for battery powered tractors, which can sustained continuously for a period of 1 h

For stand-on or sit-on tractors the rated drawbar pull shall be established using an operators mass of 90 kg (ballasted accordingly).

Note

The requirements of the quality of the floor may differ for the floor used indoor and outdoor. This floor quality depends on the operating conditions of the tractor. These conditions shall be specified in the instruction handbook (see 7.2.2).

3.11 Forward driving direction and front end

The arrow shows the forward direction of the truck (priority travel). The front end of the truck is the end nearest to the arrow.

3.11.1 Sit-on trucks

a. Counterbalanced lift truck

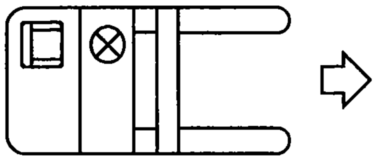


Figure 2

b. Straddle or reach truck (with retractable mast or fork)

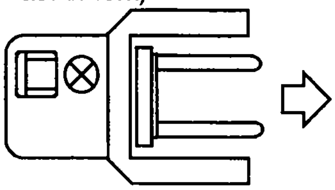


Figure 3

c. Straddle or reach truck (with retractable mast or fork) where the operator is facing at right angles to the normal line of travel

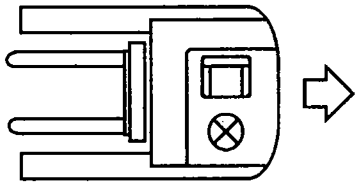


Figure 4

d. Towing tractor - Front-end control

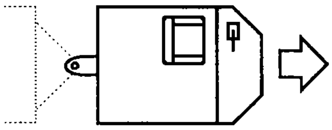


Figure 5

e. Towing tractor - Rear-end control

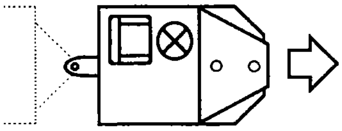


Figure 6

f. Fixed-platform truck

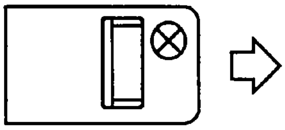


Figure 7

g. Counterbalanced lift truck with the operator facing at right angles to the to the normal line of travel

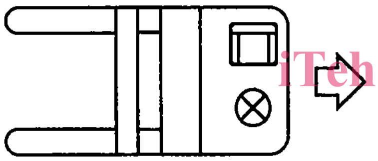


Figure 8

h. Lateral stacking truck with the operator facing at right angles normal line of travel

Figure 9

i. Lateral stacking trucks with the operator seated forward

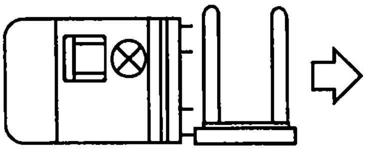


Figure 10

j. Side loading truck

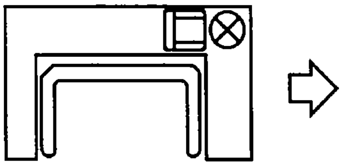


Figure 11

k. Side loading truck with the operator facing at the right angle to the normal line of travel

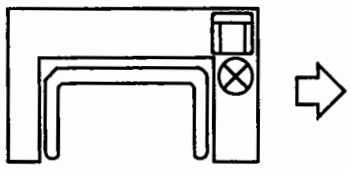


Figure 12

l. Multi directional reach trucks with operator facing at right angles to the normal line of travel

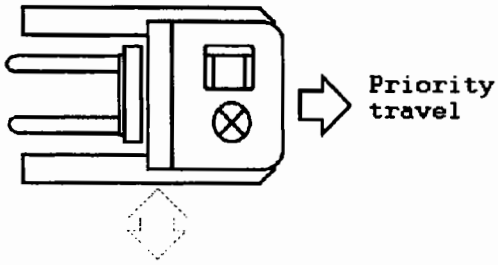


Figure 13

m. Multi directional reach truck with the operator seated forward

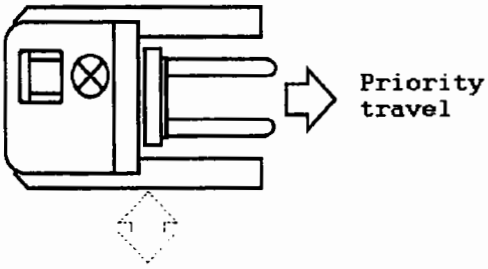


Figure 14

n. Pushing tractor

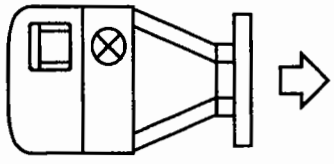


Figure 15

3.11.2 Stand-on trucks

a. Counterbalanced lift truck with steering wheel

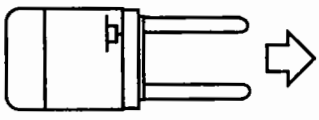


Figure 16

b. Counterbalanced lift truck with tiller control, operator facing away from load

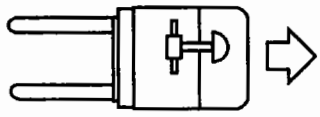


Figure 17

c. Straddle or reach truck (with retractable mast or fork)

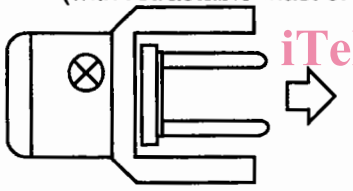


Figure 18

d. Towing tractor with tiller

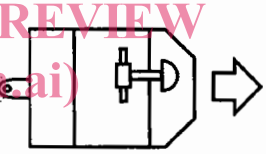


Figure 19

e. Straddle or reach truck (with retractable mast or fork) with operator facing approximately at right angles to the normal line of travel

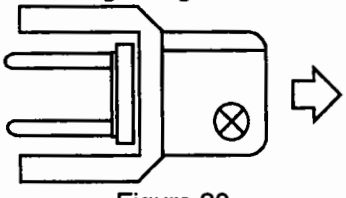


Figure 20

f. High-lift or low-lift platform truck or powered pallet truck or pallet stacker

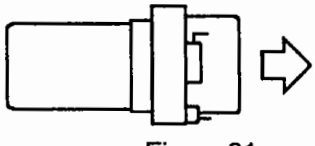


Figure 21

g. Powered pallet truck with tiller and platform and operator facing substantially away from the direction of forward travel
Note: The platform may be a fold away type - the truck will then change t pedestrian operation (see figure 29)

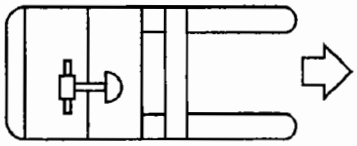


Figure 22

h. High-lift platform or fixed platform truck, powered pallet truck or pallet stacker with operator facing approximately at right angles to the normal line of travel

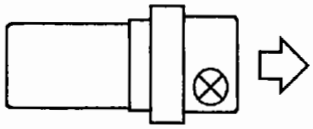


Figure 23

i. Order picker truck with tiller control (elevating operator position possible)

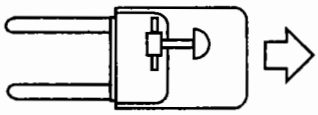


Figure 24

j. Order picker truck with steering wheel (elevating operator position possible)

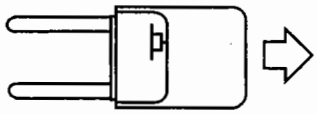


Figure 25

k. Order picker truck with steering wheel (elevating operator position possible)

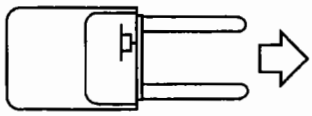


Figure 26

3.11.3 Pedestrian-controlled trucks with tiller

a. Pallet truck or high-lift pallet truck

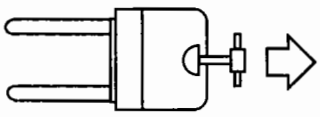


Figure 27

b. High-lift or fixed platform truck

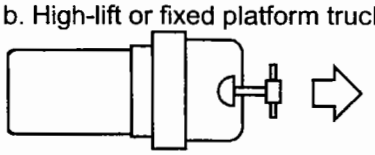


Figure 28

c. Counterbalanced lift truck

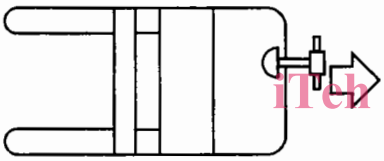


Figure 29

d. Tractor

Figure 30

e. Straddle truck or reach truck

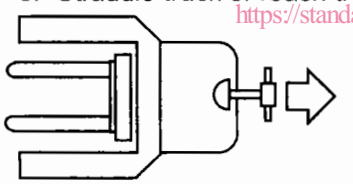


Figure 31