



**SLOVENSKI STANDARD**  
**SIST EN 1755:2001+A1:2009**

**01-julij-2009**

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Ura cgZyfU`!`I dcfUVUj`cVa c`1`j bYh^j Y[ Ud`]bUzdUfYža Y[`Y]b`dfU`i

Safety of industrial trucks - Operation in potentially explosive atmospheres - Use in flammable gas, vapour, mist and dust

Sicherheit von Flurförderzeugen - Einsatz in explosionsgefährdeten Bereichen - Verwendung in Bereichen mit brennbaren Gasen, Dämpfen, Nebeln oder Stäuben

Sécurité des chariots de manutention - Fonctionnement en atmosphères explosibles - Utilisation dans des atmosphères, inflammables dues à la présence de gaz, de vapeurs, brouillards ou poussières inflammables

**Ta slovenski standard je istoveten z: EN 1755:2000+A1:2009**

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53.060      Industrijski tovornjaki      Industrial trucks

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EUROPEAN STANDARD

**EN 1755:2000+A1**

NORME EUROPÉENNE

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ICS 53.060

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## Safety of industrial trucks - Operation in potentially explosive atmospheres - Use in flammable gas, vapour, mist and dust

Sécurité des chariots de manutention - Fonctionnement en atmosphères explosibles - Utilisation dans des atmosphères, inflammables dues à la présence de gaz, de vapeurs, brouillards ou poussières inflammables

Sicherheit von Flurförderzeugen - Einsatz in explosionsgefährdeten Bereichen - Verwendung in Bereichen mit brennbaren Gasen, Dämpfen, Nebeln oder Stäuben

This European Standard was approved by CEN on 16 August 1999 and includes Amendment 1 approved by CEN on 1 May 2009.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
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## Contents

	Page
Foreword.....	3
Introduction .....	5
<b>1 Scope .....</b>	<b>5</b>
<b>2 Normative references .....</b>	<b>6</b>
<b>3 Definitions .....</b>	<b>8</b>
<b>4 <span style="border: 1px solid black; padding: 0 2px;">A1</span> List significant of hazards <span style="border: 1px solid black; padding: 0 2px;">A1</span>.....</b>	<b>9</b>
<b>5 Safety requirements and/or measures .....</b>	<b>21</b>
<b>5.1 Trucks for conformity category 3 G.....</b>	<b>21</b>
<b>5.2 Trucks for conformity category 2 G.....</b>	<b>24</b>
<b>5.3 Trucks for conformity category 3 D.....</b>	<b>29</b>
<b>5.4 Trucks for conformity category 2 D.....</b>	<b>30</b>
<b>6 Verification of the safety requirements and/or measures .....</b>	<b>32</b>
<b>6.1 General.....</b>	<b>32</b>
<b>6.2 Temperature measurement.....</b>	<b>32</b>
<b>6.3 Earthing of trucks .....</b>	<b>35</b>
<b>6.4 Gas penetration test.....</b>	<b>35</b>
<b>6.5 Verification and test for pressurized enclosures.....</b>	<b>37</b>
<b>7 Information for use .....</b>	<b>38</b>
<b>7.1 Instruction handbook .....</b>	<b>38</b>
<b>7.2 Minimum marking .....</b>	<b>39</b>
<b>Annex A (informative) Relation between the classification of zones and their conformity categories .....</b>	<b>41</b>
<b>Annex ZA (informative) <span style="border: 1px solid black; padding: 0 2px;">A1</span> Relationship between this European Standard and the Essential Requirements of EU Directive 98/37/EC <span style="border: 1px solid black; padding: 0 2px;">A1</span>.....</b>	<b>42</b>
<b>Annex ZB (informative) <span style="border: 1px solid black; padding: 0 2px;">A1</span> Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC <span style="border: 1px solid black; padding: 0 2px;">A1</span>.....</b>	<b>43</b>
<b>Annex ZC (informative) <span style="border: 1px solid black; padding: 0 2px;">A1</span> Relationship between this European Standard and the Essential Requirements of EU Directive 94/9/EC <span style="border: 1px solid black; padding: 0 2px;">A1</span>.....</b>	<b>44</b>

## Foreword

This document (EN 1755:2000+A1:2009) has been prepared by Technical Committee CEN/TC 150 "Industrial trucks - Safety", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

This document includes Amendment 1, approved by CEN on 2009-05-01.

This document supersedes EN 1755:2000.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 and A1.

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).

A1 For relationship with EU Directive(s), see informative Annexes ZA, ZB and ZC, which are integral parts of this document. A1

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

A1 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 the electric 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 load*

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 1755:2000+A1:2009 (E)**

EN 1757-3, *Safety of industrial trucks — Pedestrian controlled manual and semi-manual trucks — Part 3: Platform trucks*

EN 1757-4, *Safety of industrial trucks — Pedestrian controlled manual and semi-manual trucks — Part 4: Scissor lift pallet-trucks*

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

prEN ISO 13564, *Powered industrial trucks — Test methods for verification of visibility — Part 1: Sit-on and stand-on operator trucks up to and including 10 t capacity (ISO/DIS 13564-1:2007)*

EN 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, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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## Introduction

This standard has been prepared to be a type C standard to provide one means of conforming with the essential requirements of the Machinery Directive and associated EFTA regulations. It will also provide one means of conforming with the essential requirements of the Directive concerning equipment and protective systems intended for use in potentially explosive atmospheres. <sup>A1</sup> The machines concerned and the extent to which hazards, hazardous situations and hazardous events are covered, are indicated in the scope of this standard. <sup>A1</sup>

In addition, industrial trucks should comply with <sup>A1</sup> EN ISO 12100-1 <sup>A1</sup> for hazards which are not covered by this standard.

<sup>A1</sup> When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard. <sup>A1</sup>

## 1 Scope

This European Standard applies to self-propelled and pedestrian controlled manual and semi-manual industrial trucks as specified in the European Standards

<sup>A1</sup> EN 1459, *Safety of industrial trucks — Self-propelled variable reach 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 load*

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 controlled manual and semi-manual trucks — Part 3: Platform trucks*

EN 1757-4, *Safety of industrial trucks — Pedestrian controlled manual and semi-manual trucks — Part 4: Scissor lift pallet-trucks* <sup>A1</sup>

<sup>A1</sup> and gives additional requirements for industrial trucks of equipment group II and equipment category 2G respectively 3G, 2D and 3D including their load handling devices as defined in Annex A. <sup>A1</sup>

<sup>A1</sup> *deleted text* <sup>A1</sup>

<sup>A1</sup> This European Standard covers the technical requirements necessary to avoid or minimize the significant hazards listed in Clause 4 which could occur during normal operation, maintenance or foreseeable misuse (in accordance with the data given by the manufacturer or his authorised representative) of industrial trucks. <sup>A1</sup>

**EN 1755:2000+A1:2009 (E)**

Trucks for group II suitable for explosive atmospheres of gas, vapour or mist shall be subdivided in accordance with the respective mixture of the potentially explosive atmospheres in which they are intended to operate. The subdivision is in accordance with **A1** 4.2 of EN 13463-1:2001 **A1**.

Trucks marked IIB are suitable for application required for Group IIA trucks. Trucks marked IIC are suitable for application required for subgroup IIA and subgroup IIB trucks, but are not suitable to be used in areas with flammable gas and vapour atmospheres containing carbon disulfide (CS<sub>2</sub>).

Where hybrid mixtures are present, the requirements for gas, vapour and mist as well as for dust shall be fulfilled.

Fork arms, load platforms or integrated attachments are part of the truck. Attachments mounted on the load carrier or fork arms are not part of the truck.

**2 Normative references**

**A1** The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. **A1**

**A1** *deleted text* **A1**

EN 1127-1:1997, *Explosive atmospheres — Explosion prevention and protection — Part 1: Basic concepts and methodology*

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

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

EN 1175-3:1998, *Safety of Industrial trucks — Part 3: Electrical requirements for the electric power transmission systems of internal combustion engine powered trucks*

**A1** EN 1551:2000 **A1**, *Safety of Industrial trucks — Self propelled trucks over 10 000 kg capacity*

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*

**A1** EN 1726-2:2000 **A1**, *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*

**A1** EN 1834-1:2000 **A1**, *Reciprocating internal combustion engines — Safety requirements for design and construction of engines for use in potentially explosive atmospheres — Part 1: Group II engines for use in flammable gas and vapour atmospheres*

**A1** EN 1834-3:2000 **A1**, *Reciprocating internal combustion engines — Safety requirements for design and construction of engines for use in potentially explosive atmospheres — Part 3: Engines for use in combustible dust atmospheres*

**A1** EN 13463-1:2001, *Non electrical equipment for potentially explosive atmospheres — Part 1: Basic method and requirements* **A1**

**A1** *deleted text* **A1**

**A1** CLC/TR 50404:2003, *Electrostatics — Code of practice for the avoidance of hazards due to static electricity* **A1**



- A1 EN 60079-0:2006, *Electrical apparatus for explosive gas atmospheres — Part 0: General requirements (IEC 60079-0:2004, modified)*
- EN 60079-1:2007, *Explosive atmospheres — Part 1: Equipment protection by flameproof enclosures "d" (IEC 60079-1:2007)*
- EN 60079-2:2007, *Explosive atmospheres — Part 2: Equipment protection by pressurized enclosures "p" (IEC 60079-2:2007)*
- EN 60079-5:2007, *Explosive atmospheres — Part 7: Equipment protection by powder filling "q" (IEC 60079-5:2007)*
- EN 60079-6:2007, *Explosive atmospheres — Part 6: Equipment protection by oil immersion "o" (IEC 60079-6:2007)*
- EN 60079-7:2007, *Explosive atmospheres — Part 7: Equipment protection by increased safety "e" (IEC 60079-7:2006)*
- EN 60079-11:2007, *Explosive atmospheres — Part 11: Equipment protection by intrinsic safety "i" (IEC 60079-11:2006)*
- EN 60079-14:2003, *Electrical apparatus for explosive gas atmospheres — Part 14: Electrical installations in hazardous areas (other than mines) (IEC 60079-14:2002)*
- EN 60079-15:2005, *Electrical apparatus for explosive gas atmospheres — Part 15: Construction, test and marking of type of protection "n" electrical apparatus (IEC 60079-15:2005)*
- EN 60079-18:2004, *Electrical apparatus for explosive gas atmospheres — Part 18: Construction, test and marking of type of protection encapsulation "m" electrical apparatus (IEC 60079-18:2004) + Corrigendum 2006*
- EN 60079-25:2004, *Electrical apparatus for explosive gas atmospheres — Part 25: Intrinsically safe systems (IEC 60079-25:2003) + Corrigendum 2006*
- EN 60079-28:2007, *Explosive atmospheres — Part 28: Protection of equipment and transmission systems using optical radiation (IEC 60079-28:2006)*
- EN 60079-29-1:2007, *Explosive atmospheres — Part 29-1: Gas detectors — Performance requirements of detectors for flammable gases (IEC 60079-29-1:2007, modified)* A1
- EN 60529:1991, *Degrees of protection provided by enclosures (IP Code)* A1 (IEC 60529:1989) A1
- A1 EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*
- EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)* A1
- A1 EN ISO 13849-1:2008, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)* A1
- IEC 60093:1980, *Methods of test for volume resistivity and surface resistivity of solid electrical insulating materials*
- A1 IEC 60243-1:1998, *Electrical strength of insulating materials — Test methods — Part 1: Tests at power frequencies (IEC 60243-1:1998)* A1
- A1 EN 61241-0:2006, *Electrical apparatus for use in the presence of combustibile dust — Part 0: General requirements (IEC 61241-0:2004, modified + corrigendum Nov. 2005)*

**EN 1755:2000+A1:2009 (E)**

EN 61241-14:2004, *Electrical apparatus for use in the presence of combustible dust — Part 14: Selection and installation (IEC 61241-14:2004)* <sup>(A1)</sup>

ISO 1813:1998, *Anti static endless V-belts; Electrical conductivity characteristics and method of test*

<sup>(A1)</sup> *deleted text* <sup>(A1)</sup>

ISO 9563:1990, *Belt drives; Electrical conductivity of antistatic endless synchronous belts; Characteristics and test method*

**3 Definitions**

For the purpose of this standard, the following definitions apply:

**3.1 explosive atmosphere**  
mixture with air, under atmospheric conditions, of flammable substances in the form of gases, vapours, mists or dusts in which, after ignition has occurred, combustion spreads to the entire unburned mixture

**3.2 potentially explosive atmosphere**  
an atmosphere which could become explosive due to local and operational conditions

**3.3 minimum ignition temperatures**  
the definition given in clauses 3.30, 3.31, 3.32 and 3.33 of EN 1127-1:1997 shall apply

**3.4 maximum surface temperature**  
the highest temperature attained in service under the most adverse operating conditions within the rating of the apparatus by any part or any surface of the equipment and accessible to the potentially explosive atmosphere

**NOTE** The manufacturer will prescribe the product standard and also in his particular design he should take into account the following other conditions:

- fault conditions specified in the standard for the type of protection concerned;
- all operating conditions specified in any other standard specified by him including recognized overloads;
- any other operating condition specified by him.

**NOTE** The relevant surface temperature may be internal or external depending upon the type of protection concerned.

**3.5****tyre**

outer part of a wheel which is of a different material from the wheel center

**3.6****categories**

the definitions of categories are covered in clause 6.4.1 of EN 1127-1:1997

**3.7****automatic monitoring**

a back-up safety function which ensures that a safety measure is initiated if the ability of a component or an element to perform its function is diminished, or if the process conditions are changed in such a way that hazards are generated

**3.8****emergency stop (function)**

Function which is intended:

- to avert arising or to reduce existing hazards to persons, damage to machinery or to work in process;
- to be initiated by a single human action.

**3.9****emergency stop (device)**

a normally actuated control device used to initiate an emergency stop function

**3.10****normal operating conditions**

the operating conditions when the truck is used in substantially firm, smooth, level and prepared surfaces

**3.11****service brake**

all build-in sequences or equipments (e.g. electrical, hydraulic or mechanical or in combination) used for deceleration of the truck in normal operating condition

## 4 A1 List significant of hazards A1

A1 This clause contains all significant hazards, hazardous situations and events, as far as they dealt with in this European Standard, identified by risk assessment as significant for this type of machinery and which requires action to eliminate or reduce the risk. A1

## EN 1755:2000+A1:2009 (E)

HAZARD	Corresponding requirement
1.0 General Requirements	
1.0.1 Principles of integrated explosion safety	5. Safety Requirements and/or Measures
1.0.2 Design considerations	5. Safety Requirements and/or Measures
1.0.3 Special checking and maintenance conditions	6.2 Temperature Measurement 7.1 Instruction Handbook
1.0.4 Surrounding area conditions	5.1.1 Hot surface
1.0.5 Marking	7.2 Minimum marking
1.0.6 Instructions	7.1 Instruction Handbook 7.2 Minimum marking
1.1 Selection of materials	
1.1.1 Explosion avoidance	5.1.2 Mechanically generated sparks and clearances 5.1.7.3 Friction Clutches 5.1.8.2 Friction Brakes 5.1.9 Load handling device 5.2.2 Mechanically generated sparks 5.2.4 Ignition by Electrostatic discharges 5.2.8.2 Mechanical Clutches 5.2.9.2.4 Added Safety 5.2.10 Load handling device 5.3.2 Mechanically generated sparks and clearances 5.3.7.2 Friction Brakes 5.3.8 Load handling device 5.4.2 Mechanically generated sparks and clearances 5.4.7 Clutches 5.4.8 Friction brakes (Service brakes) 5.4.9 Parking brakes, load handling devices and hydraulic systems
1.1.2 Limits of operating conditions reaction between materials	not applicable
1.1.3 Effects on predictable changes in materials characteristics	5.1.7.3 Friction Clutches 5.1.8.2 Friction Brakes 5.1.9 Load handling device 5.2.8.2 Mechanical Clutches 5.2.9.2.4 Added Safety 5.2.10 Load handling device 5.3.7.2 Friction Brakes 5.3.8 Load handling device 5.4.7 Clutches 5.4.8 Friction brakes (Service brakes) 5.4.9 Parking brakes, load handling devices and hydraulic systems

1.2	Design and Construction	
1.2.1	Technological knowledge of explosion protection for safe operation throughout foreseeable lifetime	5.1.1 Hot surface 5.1.2 Mechanically generated sparks and clearances 5.1.3 Ignition by Electrostatic discharges 5.1.4 Reciprocating internal combustion engines 5.1.5 Electrical Installation 5.1.6 Pneumatic systems 5.1.7 Clutches 5.1.8 Brakes 5.1.9 Load handling device 5.1.10 Hydraulic system 5.2.1 Hot surface 5.2.2 Mechanically generated sparks 5.2.3 Clearances 5.2.4 Ignition by Electrostatic discharges 5.2.5 Reciprocating internal combustion engines 5.2.6 Electrical installation 5.2.7 Pneumatic systems 5.2.8 Clutches 5.2.9 Brakes 5.2.10 Load handling device 5.2.11 Hydraulic system 5.3.1 Hot surface 5.3.2 Mechanically generated sparks and clearances 5.3.3 Reciprocating internal combustion engines 5.3.4 Electrical installation 5.3.5 Pneumatic systems 5.3.6 Clutches 5.3.7 Brakes 5.3.8 Load handling device 5.3.9 Hydraulic system 5.4.1 Hot surface 5.4.2 Mechanically generated sparks and clearances 5.4.3 Ignition by electrostatic discharges 5.4.4 Reciprocating internal combustion engines 5.4.5 Electrical installation 5.4.6 Pneumatic systems 5.4.7 Clutches 5.4.8 Friction brakes (Service brakes) 5.4.9 Parking brakes, load handling devices and hydraulic systems
1.2.2	Safe functioning of replacement components	5.1.1 Hot surface 5.1.2 Mechanically generated sparks and clearances 5.1.3 Ignition by Electrostatic discharges 5.1.4 Reciprocating internal combustion engines 5.1.5 Electrical Installation 5.1.6 Pneumatic systems 5.1.7 Clutches 5.1.8 Brakes 5.1.9 Load handling device 5.1.10 Hydraulic system 5.2.1 Hot surface

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