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**Varnost vozil za talni transport - Električne zahteve - 2. del: Splošne zahteve za vozila za talni transport z motorjem z notranjim zgorevanjem**

Safety of industrial trucks - Electrical requirements - Part 2: General requirements of internal combustion engine powered trucks

Sicherheit von Flurförderzeugen - Elektrische Anforderungen für Flurförderzeuge mit Verbrennungsmotoren

Sécurité des chariots de manutention - Prescriptions électriques - Partie 2: Prescriptions générales des chariots équipés d'un moteur thermique

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**Ta slovenski standard je istoveten z: EN 1175-2:1998**

**ICS:**

43.060.01	Motorji z notranjim zgorevanjem za cestna vozila na splošno	Internal combustion engines for road vehicles in general
53.060	Industrijski tovornjaki	Industrial trucks

**SIST EN 1175-2:1998****en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

EN 1175-2

January 1998

ICS 53.060

Descriptors: industrial trucks, heat engines, safety of machines, accident prevention, hazards, tests, electrical installation, design, control devices, protection against electric shocks, wiring, utilization, information

English version

Safety of industrial trucks - Electrical requirements - Part 2:  
General requirements of internal combustion engine powered  
trucks

Sécurité des chariots de manutention - Prescriptions  
électriques - Partie 2: Prescriptions générales des chariots  
équipés d'un moteur thermique

Sicherheit von Flurförderzeugen - Elektrische  
Anforderungen - Teil 2: Allgemeine Anforderungen für  
Flurförderzeuge mit Verbrennungsmotoren

This European Standard was approved by CEN on 23 November 1997.

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.

SIST EN 1175-2:1998

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

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## 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 July 1998, and conflicting national standards shall be withdrawn at the latest by July 1998.

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).

This European Standard is one of a package of standards for the safety of industrial trucks:

- |             |   |
|-------------|---|
| prEN 1726   | Safety of machinery - 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.   |
| prEN 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 |
| prEN 1551   | Safety of industrial trucks - Self propelled trucks over 10 000 kg capacity   |
| prEN 1459   | Safety of industrial trucks - Variable reach trucks   |
| 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 - Scissor lift pallet-trucks  |
| EN 1525     | Safety of industrial trucks - Driverless trucks and their systems   |
| 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   |

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EN 1526	Safety of industrial trucks - Automated functions of trucks
prEN 1755	Safety of industrial trucks - Operation in potentially explosive atmospheres; Use in flammable gas, vapour, mist and dust
prEN 12053	Safety of industrial trucks - Test methods for measuring noise emission
prEN ISO/DIS 13564	Test method for measuring visibility from self-propelled trucks
prEN 13059	Safety of industrial trucks - Test methods for measuring vibration
prEN 12895	Industrial trucks - Electromagnetic compatibility

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

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.

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## 0 Introduction

This European Standard is a type C standard as stated in EN 292-1. This standard has been prepared to be a harmonized standard to provide one means of conforming with the electrical aspects of the Essential Safety Requirements of the Machinery Directive and associated EFTA Regulations. Electrical installations complying with this standard are deemed to satisfy these requirements.

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

## 1 Scope

1.1 This standard specifies the electrical and related mechanical safety requirements for the design and construction of the electrical installation in internal combustion engine powered trucks (hereinafter referred to as "trucks") with starter battery nominal voltages up to and including 24 V.

NOTE 1: Part 3 of this standard details specific electrical requirements for electrical power transmission systems of internal combustion engine powered trucks.

NOTE 2: Reference is made to this standard in other standards which cover the non-electrical requirements of the various industrial truck types.

NOTE 3: This standard does not address the subject of electromagnetic compatibility (EMC).

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NOTE 4: The special requirements for operation in potentially explosive atmospheres are not covered in this standard.

1.2 The requirements of this standard are applicable, when trucks are operated under the following climatic conditions:

- Maximum ambient temperature, continuous duty: ..... + 40°C;
- Lowest ambient temperature: ..... -20 °C;
- Service altitude: ..... up to 2000 m;
- Relative humidity: ..... in the range 30 % to 95 % (non condensing).

1.3 This standard covers specific hazards which could occur during the intended use of trucks. For hazards occurring during construction, transportation, commissioning, de-commissioning and disposal, reference should be made to EN 292.

## 2 Normative references

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

EN 292-1:1991	Safety of machinery - Basic concepts, general principles for design Part 1: Basic terminology, methodology
EN 292-2:1991	Safety of machinery - Basic concepts, general principles for design Part 2: Technical principles and specifications
EN 954-1:1996	Safety of machinery - Safety related parts of control systems Part 1: General principles for design
EN 1050 : 1996	Safety of machinery - Principles for risk assessment
EN 60947-5-1:1991	Low-voltage switchgear and controlgear Part 5: Control circuit devices and switching elements Section one: Electromechanical control circuit devices (IEC 947-5-1:1990)
ISO 5053:1987	Powered industrial trucks - Terminology

## 3 Definitions

For the purposes of this standard, definitions given in ISO 5053:1987 apply together with the following:

**3.1 nominal battery voltage:** The total number of battery cells connected in series multiplied by 2 V for conventional lead acid batteries and by 1,2 V for alkaline batteries. For other types of batteries corresponding definitions apply.



## 4 List of hazards

The following significant hazards from Annex A of EN 1050:1996 (within brackets) 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 remove the hazard in each situation.

Hazard	Corresponding requirements
4.1 Mechanical hazards (1) 4.1.1 Crushing hazard (1.1) 4.1.2 Impact by collision (1.6) 4.1.2.1 - when driven by the operator 4.1.3 Loss of stability (1.11) - from excess speed - from faulty battery mass	5.1.2 Battery constrain 5.3.4 Speed limitation 5.3.5 Steering control
4.2 Electrical hazards (2) 4.2.1 Electric shock (2.1) 4.2.2 Short circuit 4.2.3 Overloading	5.1.1 Battery insulation 5.2 Protection of circuits 5.4.1 Protection 5.4.2 Cross-sectional area 5.4.3 Specification 5.4.5 Mechanical protection 5.4.6 Wiring that flexes 5.5 Protection against electric shock
4.3 Hazards generated by substances (7) <small>SIST EN 1175-2:1998</small> <small><a href="https://standards.iteh.ai/catalog/standards/sist/93ff12649564e92-9240-7311ed69f02a/sist-en-1175-2-1998">https://standards.iteh.ai/catalog/standards/sist/93ff12649564e92-9240-7311ed69f02a/sist-en-1175-2-1998</a></small>	5.1.2 Battery constraint 5.4.4 Fuel leakage
4.4 Ergonomic hazards (8) 4.4.1 Human error (8.6) 4.4.1.1 - when the truck is serviced	5.4.7 Identification 6 Information for use
4.5 Hazards due to functional disorders (10)	5.1.3 Battery disconnection 5.2 Protection of circuits 5.3.1 Low voltage 5.3.2 Frame faults 5.3.3 Load handling control 5.3.4 Speed limitation 5.3.5 Steering control 5.4.3 Specification 5.4.4 Fuel leakage 5.4.5 Mechanical protection 5.4.6 Wiring that flexes