SLOVENSKI STANDARD
SIST EN 1175-3:1998+A1:2011

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Nadomešča:
SIST EN 1175-3:1998

Varnost vozil za talni transport - Električne zahteve - 3. del: Posebne zahteve za električni sistem prenosa moči za vozila (za talni transport) z motorjem z notranjim zgorevanjem (vključno z dopolnilom A1)

Safety of industrial trucks - Electrical requirements - Part 3: Specific requirements for the electric power transmission systems of internal combustion engine powered trucks

Sicherheit von Flurförderzeugen - Elektrische Anforderungen - Teil 3: Besondere Anforderungen für elektrische Kraftübertragungssysteme von Flurförderzeugen mit Verbrennungsmotoren

Sécurité des chariots de manutention - Prescriptions électriques - Partie 3: Prescriptions particulières des systèmes à transmission électrique des chariots équipés d'un moteur thermique

Ta slovenski standard je istoveten z: **EN 1175-3:1998+A1:2010**

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53.060	Industrijski tovornjaki	Industrial trucks

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EUROPEAN STANDARD

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EN 1175-3:1998+A1

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English Version

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Foreword

This document (EN 1175-3:1998+A1:2010) 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of an identical text or by endorsement, at the latest by May 2011, and conflicting national standards shall be withdrawn at the latest by May 2011.

[A1] This document 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 document. [A1]

[A1] *deleted text* [A1]

This document includes Amendment 1, approved by CEN on 2010-09-26.

This document supersedes EN 1175-3:1998.

[A1] The main changes compared to the previous version are:

— modification of Annex ZA;

— requirements for radiation and software parameters;

— minor technical changes in 5.4.3 to 5.4.4 and 7.3;

— reference to EN 292-1 be replaced with EN ISO 12100-1:2003, EN 292-2 be replaced with EN ISO 12100-2:2003 and EN 954-1 be replaced with EN ISO 13849-1:2008. [A1]

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

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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

[A1] prEN ISO 3691-1, *Industrial trucks — Safety requirements and verification — Part 1: Self-propelled industrial trucks, other than driverless trucks, variable-reach trucks and burden-carrier trucks (ISO/DIS 3691-1:2008)* [A1]

[A1] EN 1726-2 [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 andtrucks specially designed to travel with elevated load
[A1] EN 1551 [A1]	Safety of industrial trucks - Self propelled trucks over 10 000 kg capacity
[A1] EN 1459 [A1]	Safety of industrial trucks - [A1] Self propelled variable [A1] reach trucks

[A1] EN ISO 3691-5, *Industrial trucks — Safety requirements and verification — Part 5: Pedestrian-propelled trucks (ISO 3691-5:2009)* [A1]

[A1] *deleted text* [A1]

[A1] EN 1757-3 [A1] [A1] Safety of industrial trucks - Pedestrian controlled manual and semi-manual trucks - Part 3: Platform trucks [A1]

[A1] *deleted text* [A1]

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
EN 1526	Safety of industrial trucks - Additional requirements for automated functions on trucks
[A1] EN 1755 [A1]	[A1] Safety of industrial trucks - Operation in potentially explosive atmospheres - Use in flammable gas, vapour, mist and dust [A1]
[A1] EN 12053 [A1]	Safety of industrial trucks - Test methods for measuring noise [A1] emissions [A1]
prEN ISO/DIS 13564	Test method for measuring visibility from self-propelled trucks
[A1] EN 13059 [A1]	Safety of industrial trucks - Test methods for measuring vibration
[A1] EN 12895 [A1]	Industrial trucks - Electromagnetic compatibility

[A1] *deleted text* [A1]

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, Croatia, 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.

0 Introduction

[A1] This European Standard is a type C standard as stated in EN ISO 12100-1:2003. [A1] 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. [A1] In addition, machinery should comply as appropriate with EN ISO 12100-2:2003 for hazards which are not covered by this European Standard. [A1]

1 Scope

1.1 This standard specifies the safety requirements for the design and construction of electrical power transmission systems of trucks with internal combustion engines driving one or more generators with outputs up to and including 600 V supplying power to function motors. The Annex A is normative and contains “Generators - Output and test rules”.

NOTE 1 Reference is made to this standard in other standards which cover the non-electrical requirements of the various industrial truck types.

[A1] *deleted text* [A1]

[A1] NOTE 2 The special requirements for operation in potentially explosive atmospheres are not covered in this European Standard. [A1]

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. [A1] For hazards occurring during construction, transportation, commissioning, decommissioning and disposal, reference should be made to EN ISO 12100-2:2003. [A1]

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.

[A1] *deleted text* [A1]

EN 1050:1996	Safety of machinery - Risk assessment
EN 1175-1:1998	Safety of industrial trucks - Electrical requirements Part 1: General requirements of battery powered trucks

EN 12895:2000, *Industrial trucks — Electromagnetic compatibility*

EN 60204-1:1992	Safety of machinery - Electrical equipment of machines Part 1: General requirements (IEC 204-1:1992, modified)[1)]
EN 60529:1991	Degrees of protection provided by enclosures (IP Code) (IEC 529:1989)
EN 60947-1:1991	Low-voltage switchgear and controlgear - Part 1: General rules (IEC 947-1:1988, modified)
EN 60947-4-1:1992	Low-voltage switchgear and controlgear - Part 4: Contactors and motor-starters Section one: Electromechanical contactors and motor-starters (IEC 947-4-1:1990)
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)
HD 53.6 S2:1992	Rotating electrical machines - Part 6: Methods of cooling (IC Code) (IEC 34-6:1991)

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)*

EN ISO 13849-1:2008, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)*

IEC 349:1991	Electric traction - Rotating electrical machines for rail and road vehicles
IEC 384-14:1993	Fixed capacitors for use in electronic equipment. Part 14: Sectional specification: Fixed capacitors for electromagnetic interference
ISO 5053:1987	Powered industrial trucks – Terminology

3 Definitions

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

3.1
live part
a conductor or conductive part intended to be energized in normal use

3.2
truck type test
one-off test to verify compliance with this standard for each truck type

3.3
truck routine test
repetitive test required for all production trucks

[1)] This standard applies only in parts (option 3). Specific clauses have been indicated in the text.

3.4
rated rotational frequency of generator
the frequency assigned by the manufacturer. This frequency is equivalent to the rated frequency of the internal combustion engine, if the generator is directly coupled with the engine

3.5
rated voltage of generator
for the generator two rated voltages is assigned by the manufacturer in accordance with the continuous rated output defined in A.2.3.1

3.6
rated generator output
the output in kW at the terminals of the generator assigned by the manufacturer

3.7
continuous rated output of generator
for the generator two continuous outputs are assigned. The first is determined by the temperature rise of the windings carrying the load current (higher value of the load-current and lower voltage); the second is determined by the temperature rise of the field windings at maximum excitation (lower value of the load-current with higher voltage). Both continuous rated outputs correspond to points of the full-load characteristic defined in A.3.1

4 [A1] List of significant hazards [A1]

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.

Table 1 — List of hazards

Hazard		Corresponding requirements	
4.1	Mechanical hazards (1)	5.4.1	Electrical circuit design
4.1.1	Impact by collision (1.6)	5.4.2	Travel control system
4.1.1.1	- when driven by the operator	5.4.3	Electronic travel control system
4.1.2	Loss of stability (1.11)	5.4.4	Speed limitation devices
	- from excess speed		
4.2	Electrical hazards (2)	5.1	Contactors
4.2.1	Electric shock (2.1)	5.2	Electric machines (motors and generators)
4.2.2	Short circuit	5.3.1	Protection of circuits
4.2.3	Overloading	5.3.2	Overcurrent protective devices
		5.5.1	Conductors, insulation
		5.5.3	Cables, wiring
		5.5.4	Conductors, cross-sectional area

	5.5.5 Main current cables 5.5.6 Wiring that flexes 5.5.7 Cable specifications 5.5.9 Cable insulation 5.6.1 Degree of protection 5.6.2 Protection against indirect contact 5.6.3 Connecting to the frame 5.6.4 Maximum voltages 5.6.5 Equipotential bonding 5.7 Dielectric test 5.8 Insulation resistance test
4.4 Hazards generated by substances (7) 〈A1〉 - battery charging 〈A1〉	5.3.3 Protection of electrical machines 5.5.2 Protection against fuel leakage 〈A1〉 7.3 Battery 〈A1〉
4.4 Ergonomic hazards (8) 4.4.1 Human error (8.6) 4.4.1.1 - when the truck is serviced	5.5.8 Electrical circuit identification 〈A1〉 5.9.11 Parameter 〈A1〉 〈A1〉 7.5 Non ionising radiation 〈A1〉 6.1 Electrical diagram 6.2 Safety checks 6.3 Minimum marking
4.5 Hazards due to functional disorders (10)	5.1 Contactors 5.2 Electric machines 5.4.1 Electrical circuit design 5.4.2 Travel control 5.4.3 Electronic travel control system 5.4.4 Speed limitation 〈A1〉 5.4.5 Parameter 〈A1〉 5.5.6 Wiring that flexes 5.5.7 External copper conductors