BS EN 1175:2020

BSI Standards Publication

Safety of industrial trucks – Electrical/ electronic requirements

National foreword

This British Standard is the UK implementation of EN 1175:2020. It supersedes BS EN 1175-1:1998+A1:2010, BS EN 1175-2:1998+A1:2010 and BS EN 1175-3:1998+A1:2010, which are withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MHE/7, Industrial trucks.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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English Version

Safety of industrial trucks - Electrical/electronic requirements

Sécurité des chariots de manutention - Prescriptions électriques/électroniques

Sicherheit von Flurförderzeugen - Elektrische/elektronische Anforderungen

This European Standard was approved by CEN on 1 June 2020.

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European foreword

This document (EN 1175:2020) 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of an identical text or by endorsement, at the latest by January 2021, and conflicting national standards shall be withdrawn at the latest by July 2022.

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

This document supersedes EN 1175-1:1998+A1:2010, EN 1175-2:1998+A1:2010 and EN 1175-3:1998+A1:2010.

This document specifies up-to-date requirements for electric/electronic installations of industrial trucks. Requirements are mainly based on safety functions and not only on safety related parts and take into account exclusively electric/electronic elements. This approach significantly increases the design details of the safety aspects, therefore Technical Committee CEN/TC 150 “Industrial trucks - Safety” has agreed on requesting an overlapping period of 24 months from the date of publication (DAV) of this document to the date of withdrawal (DOW) of EN 1175-1:1998+A1:2010, EN 1175-2:1998+A1:2010, EN 1175-3:1998+A1:2010, in order to allow manufacturers to update their technical construction files.

The main changes compared to the previous EN 1175 series are:

— applicability to both internal combustion engine and electric battery driven industrial trucks;

— definition of the PL_r for safety functions of the control system;

— design specifications for safety-related parts and control systems;

— specific safety requirements for Li ion energy sources;

— updated connectors and contactors requirements;

— rules for the design of the electric/electronic assistance systems;

— new standard references.

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.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This document is a type-C standard as stated in EN ISO 12100.

This document is of relevance for the following stakeholder groups representing the market players with regard to machinery safety:

— machine manufacturers (small, medium and large enterprises);

— health and safety bodies (regulators, accident prevention organizations, market surveillance etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

— machine users/employers (small, medium and large enterprises);

— machine users/employees (e.g. trade unions, organizations for people with special needs);

— service providers, e.g. for maintenance (small, medium and large enterprises).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

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

1 Scope

This document specifies the electrical requirements for the design and construction of the electrical installation in self-propelled industrial trucks that are within the scope of ISO 5053-1, except variable reach trucks as defined in ISO 5053-1:2015, 3.21 and 3.22, straddle carriers as defined in ISO 5053-1:2015, 3.18 and 3.19, and specific functions, parts and/or systems utilized for the automatic operation of driverless industrial trucks as defined in ISO 5053-1:2015, 3.32. It provides the electrical/electronic and safety-related parts of control system requirements for those self-propelled industrial trucks identified above to complete the requirements in the relevant part of the EN ISO 3691 and EN 16307 series of documents.

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

The requirements of this document are valid when trucks are operated under the following climatic conditions:

— defined in the applicable parts of the EN ISO 3691 series and the EN 16307 series;

— relative humidity in the range 30 % to 95 % (not condensing).

This document deals with safety requirements for all electrical and electronic components of industrial trucks, including electrically actuated hydraulic/pneumatic valves. It specifies minimum performance levels required for safety functions realized by safety related parts of control systems. It is intended to be used to avoid or minimize hazards or hazardous situations listed in Annex I. These situations can arise during the operation in the area of use for which it is designed and during maintenance of trucks in accordance with the specifications and instruction given by the manufacturer.

This document does not deal with hazards which could occur:

a) during construction;

b) when operating in potentially explosive atmospheres;

c) because of malfunction of non-electric safety-related parts of control systems, e.g. hydraulic and pneumatic elements like pistons, non-electric valves, pumps etc.

NOTE 2 The level of the defined required performance for electrical safety related control systems can be used as a guideline to determine the performance of non-electric systems.

NOTE 3 Hazards due to penetration of water and dust are covered by the definition of PL_r of safety functions, according to EN ISO 13849-1:2015.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendment) applies.

EN 12895:2015+A1:2019, *Industrial trucks — Electromagnetic compatibility*

EN 16307 (all parts), *Industrial trucks — Safety requirements and verification*

EN 50565-1:2014, *Electric cables — Guide to use for cables with a rated voltage not exceeding 450/750 V (U0/U) — Part 1: General guidance*

EN 60034-8:2007,[1] *Rotating electrical machines — Part 8: Terminal markings and direction of rotation (IEC 60034-8:2007)*

EN 60068-2-27:2009, *Environmental testing — Part 2-27: Tests — Test Ea and guidance: Shock (IEC 60068-2-27:2008)*

EN 60068-2-6:2008, *Environmental testing — Part 2-6: Tests — Test Fc: Vibration (sinusoidal) (IEC 60068-2-6:2007)*

EN 60204-1:2006,[2] *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2005, modified)*

EN 60332-1-2:2004,[3] *Tests on electric and optical fibre cables under fire conditions — Part 1-2: Test for vertical flame propagation for a single insulated wire or cable — Procedure for 1 kW pre-mixed flame (IEC 60332-1-2:2004)*

EN 60384-14:2013,[4] *Fixed capacitors for use in electronic equipment — Part 14: Sectional specification — Fixed capacitors for electromagnetic interference suppression and connection to the supply mains (IEC 60384-14:2013)*

EN 60529:1991,[5] *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 60664-1:2007, *Insulation coordination for equipment within low-voltage systems — Part 1: Principles, requirements and tests (IEC 60664-1:2007)*

EN 60695-11-10:2013, *Fire hazard testing — Part 11-10: Test flames — 50 W horizontal and vertical flame test methods (IEC 60695-11-10:2013)*

EN 60947-4-1:2010,[6] *Low-voltage switchgear and controlgear — Part 4-1: Contactors and motor-starters — Electromechanical contactors and motor-starters (IEC 60947-4-1:2009)*

EN 60947-5-5:1997,[7] *Low-voltage switchgear and controlgear — Part 5-5: Control circuit devices and switching elements — Electrical emergency stop device with mechanical latching function (IEC 60947-5-5:1997)*

EN 61643-11:2012, *Low-voltage surge protective devices — Part 11: Surge protective devices connected to low-voltage power systems — Requirements and test methods (IEC 61643-11:2011)*

EN 62281:2017, *Safety of primary and secondary lithium cells and batteries during transport (IEC 62281:2017)*

EN 62485-3:2014, *Safety requirements for secondary batteries and battery installations — Part 3: Traction batteries (IEC 62485-3:2014)*

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[1] As impacted by EN 60034-8:2007/A1:2014.

[2] As impacted by EN 60204-1:2006/A1:2009 and EN 60204-1:2006/corrigendum Feb. 2010.

[3] As impacted by EN 60332-1-2:2004/A1:2015 and EN 60332-1-2:2004/A11:2016.

[4] As impacted by EN 60384-14:2013/A1:2016.

[5] As impacted by EN 60529:1991/A1:2000 and EN 60529:1991/A2:2013.

[6] As impacted by EN 60947-4-1:2010/A1:2012.

[7] As impacted by EN 60947:1997/A1:2017.