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Industrial trucks – Safety requirements and verification – Part 4: Driverless industrial trucks and their systems (ISO 3691-4:2020); English version EN ISO 3691-4:2020, English translation of DIN EN ISO 3691-4:2020-11

Flurförderzeuge –
Sicherheitstechnische Anforderungen und Verifizierung –
Teil 4: Fahrerlose Flurförderzeuge und ihre Systeme (ISO 3691-4:2020);
Englische Fassung EN ISO 3691-4:2020,
Englische Übersetzung von DIN EN ISO 3691-4:2020-11

Chariots de manutention –
Exigences de sécurité et vérification –
Partie 4: Chariots sans conducteur et leurs systèmes (ISO 3691-4:2020);
Version anglaise EN ISO 3691-4:2020,
Traduction anglaise de DIN EN ISO 3691-4:2020-11

Document comprises 95 pages

Translation by DIN-Sprachendienst.

In case of doubt, the German-language original shall be considered authoritative.

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A comma is used as the decimal marker.

National foreword

This standard includes safety requirements.

This document (EN ISO 3691-4:2020) has been prepared by Technical Committee ISO/TC 110 “Industrial trucks” in collaboration with Technical Committee CEN/TC 150 “Industrial trucks - Safety” (Secretariat: BSI, United Kingdom). The responsible German body involved in its preparation was *DIN-Normenausschuss Maschinenbau* (DIN Standards Committee Mechanical Engineering), Working Group NA 060-22-42-04 AK “Driverless industrial trucks and their systems”. Representatives of manufacturers and users of industrial trucks, and of the employers’ liability insurance associations contributed to this standard.

The DIN documents corresponding to the international documents referred to in this document are as follows:

ISO 3691-1:2011	DIN EN ISO 3691-1:2017-05
ISO 3691-2:2016	DIN EN ISO 3691-2:2017-02
ISO 3691-6:2013	DIN EN ISO 3691-6:2017-02
ISO 4413:2010	DIN EN ISO 4413:2011-04
ISO 4414:2010	DIN EN ISO 4414:2011-04
ISO 12100:2010	DIN EN ISO 12100:2011-03
ISO 13849-1:2015	DIN EN ISO 13849-1:2016-06
ISO 13849-2:2012	DIN EN ISO 13849-2:2013-02
ISO 13850:2015	DIN EN ISO 13850:2016-05
ISO 13851:2019	DIN EN ISO 13851:2019-11
ISO 13856-2:2013	DIN EN ISO 13856-2:2013-08
ISO 13856-3:2013	DIN EN ISO 13856-3:2013-12
ISO 13857:2008	DIN EN ISO 13857:2008-06
ISO 14119:2013	DIN EN ISO 14119:2014-03
ISO 14120:2015	DIN EN ISO 14120:2016-05
ISO 22915-1:2016	DIN ISO 22915-1:2020-06
ISO 22915-2:2018	E DIN ISO 22915-2:2020-05
ISO 22915-3:2014	DIN ISO 22915-3:2017-04
ISO 22915-16:2014	DIN ISO 22915-16:2017-05
IEC 61496-2:2013	DIN EN 61496-2:2014-06
IEC 61496-3:2008	DIN CLC/TS 61496-3:2009-08
IEC 60204-1:2016	DIN EN 60204-1:2019-06, modified
IEC 61558-1:2017	DIN EN IEC 61558-1:2019-12

For current information on this document, please go to DIN’s website (www.din.de) and search for the document number in question.

Amendments

This standard differs from DIN EN 1525:1997-12 as follows:

a) the standard has been completely technically revised.

Previous editions

DIN EN 1525: 1997-12

National Annex NA
(informative)

Bibliography

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DIN EN ISO 3691-2:2017-02, *Industrial trucks — Safety requirements and verification — Part 2: Self-propelled variable-reach trucks (ISO 3691-2:2016)*

DIN EN ISO 3691-6:2017-02, *Industrial trucks — Safety requirements and verification — Part 6: Burden and personnel carriers (ISO 3691-6:2013)*

DIN EN ISO 4413:2011-04, *Hydraulic fluid power — General rules and safety requirements for systems and their components (ISO 4413:2010)*

DIN EN ISO 4414:2011-04, *Pneumatic fluid power — General rules and safety requirements for systems and their components (ISO 4414:2010)*

DIN EN ISO 12100:2011-03, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

DIN EN ISO 13849-1:2016-06, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2015)*

DIN EN ISO 13849-2:2013-02, *Safety of machinery — Safety-related parts of control systems — Part 2: Validation (ISO 13849-2:2012)*

DIN EN ISO 13850:2016-05, *Safety of machinery — Emergency stop function — Principles for design (ISO 13850:2015)*

DIN EN ISO 13851:2019-11, *Safety of machinery — Two-hand control devices — Functional aspects and principles for design (ISO 13851:2019)*

DIN EN ISO 13856-2:2013-08, *Safety of machinery — Pressure-sensitive protective devices — Part 2: General principles for the design and testing of pressure-sensitive edges and pressure-sensitive bars (ISO 13856-2:2013)*

DIN EN ISO 13856-3:2013-12, *Safety of machinery — Pressure-sensitive protective devices — Part 3: General principles for design and testing of pressure-sensitive bumpers, plates, wires and similar devices (ISO 13856-3:2013)*

DIN EN ISO 13857:2008-06, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

DIN EN ISO 14119:2014-03, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection (ISO 14119:2013)*

DIN EN ISO 14120:2016-05, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards (ISO 14120:2015)*

DIN ISO 22915-1:2020-06, *Industrial trucks — Verification of stability — Part 1: General (ISO 22915-1:2016)*

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DIN ISO 22915-3:2017-04, *Industrial trucks — Verification of stability — Part 3: Reach and straddle trucks (ISO 22915-3:2014)*

DIN ISO 22915-16:2017-05, *Industrial trucks — Verification of stability — Part 16: Pedestrian-propelled trucks (ISO 22915-16:2014)*

DIN EN 61496-2:2014-06, *Safety of machinery — Electro-sensitive protective equipment — Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs) (IEC 61496-2:2013)*

DIN CLC/TS 61496-3:2009-08, *Safety of machinery — Electro-sensitive protective equipment — Part 3: Particular requirements for Active Opto-electronic Protective Devices responsive to Diffuse Reflection (AOPDDR) (IEC 61496-3:2008)*

DIN EN 60204-1:2019-06, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2016, modified)*

DIN EN IEC 61558-1:2019-12, *Safety of transformers, reactors, power supply units and combinations thereof — Part 1: General requirements and tests (IEC 61558-1:2017)*

EUROPEAN STANDARD

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English Version

Industrial trucks - Safety requirements and verification - Part 4: Driverless industrial trucks and their systems (ISO 3691-4:2020)

Chariots de manutention - Exigences de sécurité et vérification - Partie 4: Chariots sans conducteur et leurs systèmes (ISO 3691-4:2020)

Flurförderzeuge - Sicherheitstechnische Anforderungen und Verifizierung - Teil 4: Fahrerlose Flurförderzeuge und ihre Systeme (ISO 3691-4:2020)

This European Standard was approved by CEN on 11 January 2020.

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European foreword

This document (EN ISO 3691-4:2020) has been prepared by Technical Committee ISO/TC 110 "Industrial trucks" in collaboration with 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 2020, and conflicting national standards shall be withdrawn at the latest by November 2020.

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 1525:1997.

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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 3691-4:2020 has been approved by CEN as EN ISO 3691-4:2020 without any modification.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 110, *Industrial trucks*, Subcommittee SC 2, *Safety of powered industrial trucks.*

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

A list of all parts in the ISO 3691 series can be found on the ISO website.

Introduction

General

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

This document is of relevance, in particular, 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);

— consumers (in case of machinery intended for use by consumers).

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 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.

Structure

An important step forward in the work on the ISO 3691 series of standards was the agreement to issue a new structure of International Standards for industrial trucks having on one side basic standards for all types of trucks and on the other side independent standards to cover the respective specific functions of industrial trucks, e.g. visibility, noise, electrical requirements, etc.

Assessment of hazards

The product needs to be designed in such a way that it is fit for its purpose or function and can be adjusted and maintained without putting persons at risk when used under the conditions foreseen by the manufacturer.

In order to properly design a product and to cover all specific safety requirements, the manufacturer needs to identify the hazards that apply to their product and carry out a risk assessment. The manufacturer then needs to design and construct the product taking this assessment into account.

The aim of this procedure is to eliminate the risk of accidents throughout the foreseeable lifetime of the machinery, including the phases of assembling and dismantling where risks of accidents can also arise from foreseeable abnormal situations.

In selecting the most appropriate methods, the manufacturer needs to apply the following principles, in the order given here:

a) eliminate or reduce risks as far as possible by design (inherently safe machinery design and construction);

b) take the necessary protective measures in relation to risks that cannot be eliminated by design;

c) inform users of any shortcoming of the protective measures adopted;

d) indicate whether any particular training is required;

e) specify any need to provide personal protection equipment;

f) refer to the appropriate user's document for proper operating instructions.

Industrial trucks need to be designed to prevent foreseeable misuse wherever possible, if such would engender risk. In other cases, the manufacturer's instructions need to draw the user's attention to ways shown by experience in which the machinery ought not to be used.

This document 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. Refer to ISO 12100.

Global relevance

From the very beginning, the task was to revise ISO 3691:1980 to establish international basic standards to align with the major legislative regulations in, for example, the EU, Japan, Australia and North America.

Every effort was made to develop a globally relevant International Standard. That goal was achieved for most of the issues addressed. For several potential problem areas, compromises were needed and will still be needed in the future. Where divergent regional requirements remain, these are addressed by ISO/TS 3691-8.