



SLOVENSKI STANDARD

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Vozila za talni transport - Varnostne zahteve in preverjanje - 2. del: Dodatne zahteve za vozila za talni transport z lastnim pogonom z mehanizmom za dviganje s spremenljivim dosegom

Industrial trucks - Safety requirements and verification - Part 2: Supplementary requirements for self-propelled variable-reach trucks

Flurförderzeuge - Sicherheitstechnische Anforderungen und Verifizierung - Teil 2: Zusätzliche Anforderungen für motorkraftbetriebene Flurförderzeuge mit veränderlicher Reichweite

Chariots de manutention - Exigences de sécurité et vérification - Partie 2 : Exigences supplémentaires pour les chariots automoteurs à portée variable

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Industrial trucks - Safety requirements and verification - Part 2: Supplementary requirements for self-propelled variable-reach trucks

Chariots de manutention - Exigences de sécurité et
vérification - Partie 2 : Exigences supplémentaires pour
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Flurförderzeuge - Sicherheitstechnische
Anforderungen und Verifizierung - Teil 2: Zusätzliche
Anforderungen für motorkraftbetriebene
Flurförderzeuge mit veränderlicher Reichweite

This European Standard was approved by CEN on 9 January 2023.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 16307-2:2023) 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of an identical text or by endorsement, at the latest by September 2023, and conflicting national standards shall be withdrawn at the latest by September 2024.

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.

The EN 16307 series, under the general title *Industrial trucks — Safety requirements and verification*, consists of the following parts:

- *Part 1: Supplementary requirements for self-propelled industrial trucks, other than driverless trucks, variable-reach trucks and burden-carrier trucks;*
- *Part 2: Supplementary requirements for self-propelled variable-reach trucks;*
- *Part 3: Supplementary requirements for trucks with elevating operator position and trucks specifically designed to travel with elevated loads (additional requirements to EN 16307-1);*
- *Part 5: Supplementary requirements for pedestrian-propelled trucks;*
- *Part 6: Supplementary requirements for burden and personnel carriers.*

This document is intended to be used with EN ISO 3691-2:2023, *Industrial trucks — Safety requirements and verification — Part 2: Self-propelled variable-reach trucks (ISO 3691-2:2023)*.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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, Türkiye and the United Kingdom.

EN 16307-2:2023 (E)**Introduction**

This document is a type-C standard as stated in EN ISO 12100:2010.

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).

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

The machines 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.

The EN 16307 series of standards covers safety requirements and their verification for industrial trucks as defined in ISO 5053-1:2020 that are not covered exhaustively by the EN ISO 3691 series.

1 Scope

This document specifies requirements for the types of industrial trucks specified in the scope of EN ISO 3691-2:2023.

This document is intended to be used in conjunction with EN ISO 3691-2:2023. These requirements are supplementary to those stated in EN ISO 3691-2:2023.

This document deals with the following supplementary requirements and significant hazards, hazardous situations or hazardous events relevant, when it is used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer:

- electrical requirements;
- noise emissions;
- vibration;
- electromagnetic radiation.

This document specifies supplementary requirements to EN ISO 3691-2:2023:

- operator's seat;
- protection against crushing, shearing and trapping;
- longitudinal stability determination;
- visibility;
- information for use (instruction handbook and marking).

<https://standards.iteh.ai/catalog/standards/sist/ca6c7eff-2293-4375-8afc-0ae661f0b61e/sist-Annex A> (informative) contains the list of significant hazards covered by this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 1175:2020, *Safety of industrial trucks — Electrical/electronic requirements*

EN 12053:2001+A1:2008, *Safety of industrial trucks — Test methods for measuring noise emissions*

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

EN 13059:2002+A1:2008, *Safety of industrial trucks — Test methods for measuring vibration*

EN 13490:2001+A1:2008, *Mechanical vibration — Industrial trucks — Laboratory evaluation and specification of operator seat vibration*

EN 15000:2008, *Safety of industrial trucks — Self propelled variable reach trucks — Specification, performance and test requirements for longitudinal load moment indicators and longitudinal load moment limiters*

EN 16842-4:2019, *Powered industrial trucks — Visibility — Test methods and verification — Part 4: Industrial variable reach trucks up to and including 10 000 kg capacity*

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EN 16842-5:2021, *Powered industrial trucks — Visibility — Test methods and verification — Part 5: Industrial variable-reach trucks greater than 10 000 kg capacity*

EN 16842-7:2018, *Powered industrial trucks — Visibility — Test methods and verification — Part 7: Variable-reach and masted container trucks handling freight containers of 6 m (20 ft) length and longer*

EN ISO 3691-2:2023, *Industrial trucks — Safety requirements and verification — Part 2: Self-propelled variable-reach trucks (ISO 3691-2:2023)*

EN ISO 11688-1:2009, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning (ISO/TR 11688-1:1995)*

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

ISO 5053-1:2020, *Industrial trucks — Vocabulary — Part 1: Types of industrial trucks*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5053-1:2020 and EN ISO 3691-2:2023 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org>

4 Safety requirements and/or protective/risk reduction measures**4.1 General**

The following applies to the self-propelled variable-reach trucks, dealt with in EN ISO 3691-2:2023. These are additional to the requirements of EN ISO 3691-2:2023 and, in certain instances, replace them.

4.2 Electrical requirements

The requirements of EN ISO 3691-2:2023, 4.1.5 shall apply except the reference to ISO/TS 3691-8 with the following addition:

Electrical systems and equipment shall be in accordance with EN 1175:2020.

4.3 Operator's seat

The requirements of EN ISO 3691-2:2023, 4.7.2 shall apply with the following addition:

The operator's seat shall be specified and marked in accordance with EN 13490:2001+A1:2008.

4.4 Protection against crushing, shearing and trapping

The requirements of EN ISO 3691-2:2023, 4.7.7.1 shall apply with the following addition:

Where fixed and/or removable guard systems are needed the requirements of EN ISO 14120:2015 shall be met.

When a fixed guard is removed, its fixing system shall remain on the guard or truck. This requirement applies to any fixed guards that are liable to be removed by the user with a risk of loss of the fixings, e.g.

fixed guards that are liable to be removed during routine maintenance or setting operations carried out at the place of use.

4.5 Longitudinal stability determination

The requirements of EN ISO 3691-2:2023, 4.8.3 shall apply with the following addition:

Variable-reach trucks with a maximum working load of not less than 1000 kg shall be fitted with a longitudinal load moment indicator (LLMI) and a longitudinal load moment control (LLMC) complying with EN 15000:2008.

4.6 Visibility

The requirements of EN ISO 3691-2:2023, 4.10.1 shall apply except the reference to ISO 13564-1 and with the following modification:

Industrial variable-reach trucks up to and including 10 000 kg capacity shall comply with EN 16842-4:2019.

Industrial variable-reach trucks greater than 10 000 kg capacity shall comply with EN 16842-5:2021.

Variable-reach and masted container trucks handling freight containers of 6 m (20 ft) length and longer shall comply with EN 16842-7:2018.

4.7 Reduction of noise by design

4.7.1 General

Industrial trucks shall be designed and constructed such that risks resulting from the emission of airborne noise are reduced according to the state of the art.

When noise is a significant hazard, there is need for a low-noise design. In this case, the methodology for low-noise design given in EN ISO 11688-1:2009 shall be considered.

NOTE EN ISO 11688-2:2000 gives useful information on noise generation mechanisms in machinery.

Usually, noise is not a significant hazard for battery-powered trucks.

4.7.2 Main source of noise

On industrial trucks, the main sources of noise are components, such as the following, in a high-speed operation mode:

- combustion engines, including air intake, cooling fan and exhaust system;
- hydraulic pumps/motors.

4.7.3 Measures to reduce noise at the operator's position

Typical measures to reduce noise include:

- selection of low-noise components;
- use of elastic mountings that prevent the transmission of structure born noise from the components to the structures;
- the use of improved noise insulation in the cabin, if fitted.

These and other measures of identical or better efficiency may be used.

EN 16307-2:2023 (E)**4.7.4 Determination of noise emission values**

The noise emission value shall be measured using the test method given in EN 12053:2001+A1:2008.

4.8 Vibration

The requirements of EN ISO 3691-2:2023, 4.13.2 shall apply with the following addition:

Whole body vibration shall be measured using the test method given in EN 13059:2002+A1:2008.

4.9 Electromagnetic radiation**4.9.1 General**

The requirements of EN ISO 3691-2:2023, 4.13.3 shall apply with the following additions:

4.9.2 Non-ionising radiation

Where trucks are fitted with functional related non-ionising radiation devices, the radiation shall be minimized with consideration to the influence on persons, in particular with active or passive implantable medical devices.

Electromagnetic emission of trucks shall comply with EN 12895:2015+A1:2019, 4.1.

4.9.3 External radiation

Electromagnetic immunity of trucks shall comply with EN 12895:2015+A1:2019, 4.2 (Table 1 items 1.1, 1.2, 1.3, 2.1 and 2.2).

4.10 Electrostatic discharge

Immunity against electrostatic discharge shall comply with EN 12895:2015+A1:2019, 4.2 (Table 1 item 1.4)

4.11 Operator restraint system

Whenever the truck is switched-on and in drive mode, a visual warning shall indicate to the operator that the restraint system as required in EN ISO 3691-2:2023, 4.7.3, is not engaged (e.g. seat belt not buckled, door bar or cabin door not closed).

NOTE 1 Engaged operator restraint system means that the system is applied (seatbelt buckled, cabin door or door bar closed) by the operator and an electronic signal can be detected which confirms the engagement.

The warning shall be visible to the operator in the normal operating position.

NOTE 2 A suggestion for a symbol could be lighting symbol ISO 7000:2019, No. 0249.

When the restraint device is engaged, the visual warning shall be switched-off.

When the restraint device is not engaged, and the truck speed is greater than 4 km/h an audible warning shall be given to the operator. If it is not possible to determine the speed of the truck, an audible warning shall be given after a reasonable time after switch-on of the truck, latest 30 s after switch-on of the truck or detection of the operator by the operator control (e.g. seat switch) when the restraint device is not engaged.

When the truck is equipped with more than one operator restraint, it is sufficient if one of these devices is engaged.

When the truck is equipped with a driving system that is not able to accelerate the truck to a speed of more than 4 km/h if the restraint system is not engaged, an audible warning is not required.