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

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

Sicherheit von Flurförderzeugen - Sicherheitsanforderungen 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  
les chariots automoteurs à portée variable

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 150.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## European foreword

This document (prEN 16307-2:2017) has been prepared by Technical Committee CEN/TC 150 "Industrial trucks - Safety", the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

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, see informative Annex ZA, which is an integral part of this document.

This document is based on ISO/TS 3691-7 "Industrial trucks - Safety requirements and verification - Part 7: Regional additions for countries within the European Community" and is limited to self propelled industrial trucks.

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

- 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 4: "Supplementary requirements for driverless industrial trucks and their systems"
- 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 "Industrial trucks — Safety requirements and verification: Part: 2: self-propelled variable-reach trucks".

## Introduction

### General

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

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 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 that are not covered exhaustively by EN ISO 3691 series.

### Assessment of hazards

The product should 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 will identify the hazards that apply to his product and carry out a risk assessment. The manufacturer will then 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 could also arise from foreseeable abnormal situations.

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

This part of EN 16307 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. Reference should also be made to EN ISO 12100.

## 1 Scope

This European standard gives requirements for the types of industrial trucks specified in the scope of EN ISO 3691-2.

This standard is intended to be used in conjunction with EN ISO 3691-2. These requirements are supplementary to those stated in EN ISO 3691-2 with the addition of hazard which can occur when operating in potentially explosive atmospheres.

This European standard replaces the following requirements of EN ISO 3691-2:

- electrical requirements.

This European standard covers the following requirements as specified in EN ISO 3691-2:

- noise emissions;
- vibration;
- electromagnetic compatibility (EMC).

This European standard defines supplementary requirements to EN ISO 3691-2:

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

Annex A (informative) contains the list of significant hazards covered by this standard.

## 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 (all parts), *Safety of industrial trucks — Electrical requirements*

EN 1755, *Industrial Trucks - Safety requirements and verification - Supplementary requirements for operation in potentially explosive atmospheres*

EN 12053, *Safety of industrial trucks — Test methods for measuring noise emissions*

EN 12895, *Industrial trucks - Electromagnetic compatibility*

EN 13059, *Safety of industrial trucks — Test methods for measuring vibration*

EN 13490, *Mechanical vibration — Industrial trucks — Laboratory evaluation and specification of operator seat vibration*

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

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

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

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

ISO 5053-1:2015, *Industrial trucks — Terminology and classification — Part 1: Types of industrial trucks*

**3 Terms and definitions**

For the purposes of this document, the terms and definitions given in ISO 5053-1:2015 and EN ISO 3691-2:2016 apply.

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

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

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

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

**4.2 Electrical requirements**

Electrical systems and equipment shall be in accordance with the relevant part(s) of EN 1175.

**4.3 Operator's seat**

The requirements of EN ISO 3691-2:2016, Clause 4.7.2 shall apply with the following addition:

The operator's seat shall be specified and marked in accordance with EN 13490.

**4.4 Protection against crushing, shearing and trapping**

The requirements of EN ISO 3691-2:2016, Clause 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 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 3691-2:2016, Clause 4.8.3 shall apply with the following addition:



Variable-reach trucks shall be fitted with a longitudinal load moment indicator (LLMI) and a longitudinal load moment control (LLMC) complying with EN 15000.

#### 4.6 Visibility

The requirements of EN ISO 3691-1:2016, 4.10.1 shall apply with the following modifications:

Replace the requirement given in ISO 13564-1:2012, 9.2.2 a) with the following:

forward direction

25 % of the vertical surface of the test body

rearward direction

20 % of the vertical surface of the test body

Replace the required minimum illuminated area of test surface as required by ISO 13564-1:2012, Table 3, Test No.1, with the following:

25 % of the vertical surface of the test body

ISO 13564-1:2012 will be replaced by a European visibility standard which is under development based on ISO 13564-1:2012.

#### 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 shall be considered.

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

Normally, 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.

**prEN 16307-2:2017 (E)****4.7.4 Determination of noise emission values**

The value of noise emission shall be measured using the test method given in EN 12053.

**4.8 Vibration**

Whole body vibration shall be measured using the test method given in EN 13059.

**4.9 Electromagnetic compatibility (EMC)**

The truck's EMC shall comply with EN 12895.

**4.10 Operation in potentially explosive atmospheres**

Trucks operating in potentially explosive atmospheres shall comply with EN 1755.

**5 Verification of safety requirements and/or protective measures**

The requirements specified in Clause 4 shall be verified in accordance with the referenced standards.

**6 Information for use****6.1 Instruction handbook(s)**

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**6.1.1 Truck attachments**

The requirements of EN ISO 3691-2:2016, Clause 6.2.1 shall apply with the following addition:

In addition, the instruction handbook(s) shall include, as applicable, the following:

- Information on stability;
- the noise value in accordance with EN 12053;
- the vibration value in accordance with EN 13059;
- the static test coefficient used for lifting accessory.

**6.1.2 Operation of truck**

The requirements of EN ISO 3691-2:2016, Clause 6.2.2 shall apply with the following addition:

In addition, the instruction handbook(s) shall include, as applicable, the following:

- information about specific protective devices (e.g. protective screen) and their use.

**6.1.3 Transportation, commissioning and storage**

The requirements of EN ISO 3691-2:2016, 6.2.6 shall apply with the following addition:

Further to EN ISO 3691-2:2016, 6.2.6 c), the instruction handbook(s) shall include, as applicable, the procedure for truck mounting.

**6.2 Marking – Information plates**

The requirements of EN ISO 3691-2:2016, 6.3.1 shall apply with the following modifications: