
Vozila za talni transport - Varnostne zahteve in preverjanje - 1. del: Dodatne zahteve za vozila za talni transport z lastnim pogonom, razen za vozila brez voznika, vozila s spremenljivim dosegom ter tovorna in osebna vozila

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

Sicherheit von Flurförderzeugen - Sicherheitsanforderungen und Verifizierung - Teil 1: Zusätzliche Anforderungen für motorkraftbetriebene Flurförderzeuge mit Ausnahme von fahrerlosen Flurförderzeugen, Staplern mit veränderlicher Reichweite und Lasten- und Personentransportfahrzeugen

Chariots de manutention - Exigence de sécurité et vérifications - Partie 1 : Exigences supplémentaires pour les chariots autres que les chariots sans conducteur, les chariots à portée variable et les chariots porteurs de charge

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**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**

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Flurförderzeugen, Staplern mit veränderlicher
Reichweite und Lasten- und
Personentransportfahrzeugen

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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 foreword

This document (prEN 16307-1:2018) 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 will supersede EN 16307-1:2013+A1:2015.

The main changes with respect to the first edition are as follows:

- a) The requirements in respect to visibility 4.12 have been changed.
- b) Requirements for the operator restraint device have been added.

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.

This document is based on ISO/TS 3691-7 “Industrial trucks - Safety requirements and verification - Part 7: Regional requirements 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 to be used with EN 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”.

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

In selecting the most appropriate methods, the manufacturer will need 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 instructions will need to 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 will also need to be made to EN ISO 12100.

1 Scope

This document gives requirements for the types of industrial trucks specified in the scope of EN ISO 3691-1.

This document is intended to be used in conjunction with EN ISO 3691-1. These requirements are supplementary to those stated in EN ISO 3691-1 with the addition of hazards, which can occur when operating in potentially explosive atmospheres.

This document covers the following requirements:

- electrical requirements;
- noise emissions;
- vibration;
- visibility;
- electromagnetic compatibility (EMC).

This Edocument defines supplementary requirements to EN ISO 3691-1:

- travel speed;
- brakes;
- travel and breaking controls - Additional operation from alongside pedestrian-controlled and stand-on trucks;
- lift chains;
- mast tilt and carriage isolation;
- operator's seat;
- operator restraint device;
- protection against crushing, shearing and trapping;
- information for use (instruction handbook and marking).

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 (all parts:1998+A1:2010), *Safety of industrial trucks — Electrical requirements*

EN 1755:2015, *Industrial Trucks — Safety requirements and verification — Supplementary requirements for operation in potentially explosive atmospheres*

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

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EN 12895:2015, *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 16203:2014, *Safety of Industrial Trucks — Dynamic tests for verification of lateral stability — Counterbalanced Trucks*

EN 16842-1:2018, *Powered industrial trucks — Visibility — Test methods and verification — Part 1: General requirements*

EN 16842-2:2018, *Powered industrial trucks — Visibility — Test methods and verification — Part 2: Sit-on counterbalance trucks and rough terrain masted trucks up to and including 10 000 kg capacity*

EN 16842-3:2019, *Powered industrial trucks — Visibility — Test method and verification — Part 3: Reach trucks up to and including 10000 kg*

EN 16842-6:2018, *Powered industrial trucks — Visibility — Test methods and verification — Part 6: Sit-on counterbalance trucks and rough terrain masted trucks greater than 10000 kg capacity*

EN ISO 3691-1:2015, *Industrial trucks — Safety requirements and verification — Part 1: Self-propelled industrial trucks, other than driverless trucks, variable-reach trucks and burden-carrier trucks (ISO 3691-1:2011, including Cor 1:2013)*

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

ISO 6292:2008, *Powered industrial trucks and tractors — Brake performance and component strength*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5053-1:2015 and EN ISO 3691-1:2015 and the following 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>

3.1

operator restraint system

device or system, which is permanently installed to keep the operator on the seat or in the protective structure of the truck

Note 1 to entry: An operator restraint system could be e.g. seat belt, cabin door

4 Safety requirements and/or protective measures

4.1 General

The following applies to the self-propelled industrial trucks, other than driverless trucks, variable-reach trucks and burden-carrier trucks, dealt with in EN ISO 3691-1. These are additional to the requirements of EN ISO 3691-1 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 Travel speed

The requirements of EN ISO 3691-1:2015, 4.2.3 shall apply, except the reference to ISO/TS 3691-8, with the following addition:

The travel speed of variable-speed pedestrian-controlled trucks operating on level ground shall not exceed 6 km/h.

The maximum speed on level ground of stand-on trucks and pedestrian-controlled trucks fitted with a foldable platform when the operator is on the platform shall not exceed 16 km/h.

4.4 Brakes

The requirements of EN ISO 3691-1:2015, 4.3.1 shall apply, except the reference to ISO/TS 3691-8, with the following addition:

The parking and service brakes of trucks that can travel with an elevated operator position and/or elevated load above 500 mm, and up to and including 1 200 mm, are subject to the following requirements:

- for travel speeds up to and including 9 km/h, parking brakes shall be in accordance with ISO 6292:2008, 6.1.2 a), and service brakes shall comply with the specifications of ISO 6292:2008, Table 2, Group C;
- for travel speeds above 9 km/h, parking brakes shall be in accordance with ISO 6292:2008, 6.1.2 b) and service brakes shall comply with the specifications of ISO 6292:2008, Table 2, Group A1.

4.5 Additional operation from alongside pedestrian-controlled and stand-on trucks

The requirements of EN ISO 3691-1:2015, 4.4.2.7 shall apply, except the reference to ISO/TS 3691-8, with the following addition:

Low-lift order-picking trucks provided with a system that allows operating while walking alongside the truck are subject to the following requirements:

- activation of the travel control device from outside of the truck shall only be possible when the truck is stationary;
- the travel control shall be a hold-to-run control and the speed shall not exceed 4 km/h while operating the travel control from outside of the truck;
- braking function shall be automatically applied when travel control device is released.

4.6 Lift chains

The requirements of EN ISO 3691-1:2015, 4.6.1 shall apply, except the reference to ISO/TS 3691-8, with the following addition:

The minimum safety factor of the lifting mechanism, K_1 , shall be as follows:

- for trucks $\leq 10\,000$ kg rated capacity:

$$K_1 \geq 5$$

- for trucks $> 10\,000$ kg rated capacity:

$$K_1 \geq 5 - 0,2(Q' - 10), \text{ but not less than } 4$$

where Q' is the rated capacity of the truck, in tonnes.

4.7 Mast tilt and carriage isolation

The requirements of EN ISO 3691-1:2015, 4.6.3.5 shall apply, with the following addition:

For ride-on trucks, the movement of powered attachments shall not be possible through operation of the control when the operator is not in the normal operating position.

4.8 Operator's seat

The requirements of EN ISO 3691-1:2015, 4.7.4 shall apply with the following addition:

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

4.9 Protection against crushing, shearing and trapping

4.9.1 General

The requirements of EN ISO 3691-1:2015, 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 on the 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.

4.9.2 Pedestrian and stand-on end-controlled trucks with mast

The mast shall be guarded at the side facing the operating controls, e.g. by a transparent cover. The guard shall, as a minimum, cover the whole width of the hazardous zone and the full length of the non-elevated mast, or up to 2,2 m from the ground, whichever is less.

4.9.3 Load control

NOTE Taking into account the state of the art, it is not possible to meet the objectives for load control and load moment indicators.