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

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

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Chariots de manutention - Exigences de sécurité et vérification - Partie 1: Exigences supplémentaires pour les chariots de manutention automoteurs, autres que les chariots sans conducteur, les chariots à portée variable et les chariots transporteurs de charges

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Supplementary requirements for self-propelled industrial trucks,
other than driverless trucks, variable-reach trucks and burden-
carrier trucks**

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Flurförderzeuge mit Ausnahme von fahrerlosen
Flurförderzeugen, Staplern mit veränderlicher Reichweite
und Lasten- und Personentransportfahrzeugen

This European Standard was approved by CEN on 4 November 2012.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 16307-1:2013) 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of an identical text or by endorsement, at the latest by July 2013, and conflicting national standards shall be withdrawn at the latest by July 2013.

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

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".

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 16307-1:2013 (E)**0 Introduction****0.1 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 that are not covered exhaustively by EN ISO 3691 series.

0.2 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 European Standard gives requirements for the types of industrial trucks specified in the scope of EN ISO 3691-1.

This European Standard 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 European standard covers the following requirements:

- Electrical requirements
- Noise emissions
- Vibration
- Electromagnetic compatibility (EMC)

This European standard 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
- Protection against crushing, shearing and trapping
- Visibility
- Information for use (instruction handbook and marking)

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

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 953, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

EN 1175:1998+A1:2010 (all parts), *Safety of industrial trucks — Electrical requirements*

EN 1755, *Safety of industrial trucks — Operation in potentially explosive atmospheres — Use in flammable gas, vapour, mist and dust*

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*

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

EN ISO 3691-1:2012, *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)*

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

ISO 5053:1987, *Powered industrial trucks — Terminology*

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

ISO 13564-1:2012, *Powered industrial trucks — Test methods for verification of visibility — Part 1: Sit-on and stand-on operator trucks up to and including 10 t capacity*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5053:1987 and EN ISO 3691-1:2012 apply.

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 3691-1:2012, 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 3691-1:2012, 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 3691-1:2012, 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 3691-1:2012, 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 3691-1:2012, 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 3691-1:2012, 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 3691-1:2012, 4.7.7.1 shall apply with the following addition: