SLOVENSKI STANDARD
oSIST prEN ISO 3691-2:2021

01-december-2021

Vozila za talni transport - Varnostne zahteve in preverjanje - 2. del: Vozila z lastnim pogonom s spremenljivim dosegom (ISO/DIS 3691-2:2021)

Industrial trucks - Safety requirements and verification - Part 2: Self-propelled variable-reach trucks (ISO/DIS 3691-2:2021)

Sicherheit von Flurförderzeugen - Sicherheitsanforderungen und Verifizierung - Teil 2: Motorkraftbetriebene Flurförderzeuge mit veränderlicher Reichweite (ISO/DIS 3691-2:2021)

Chariots de manutention - Exigences de sécurité et vérification - Partie 2: Chariots automoteurs à portée variable (ISO/DIS 3691-2:2021)

Ta slovenski standard je istoveten z: **prEN ISO 3691-2**

ICS:

53.060	Industrijski tovornjaki	Industrial trucks

oSIST prEN ISO 3691-2:2021 **en,fr,de**

DRAFT INTERNATIONAL STANDARD

ISO/DIS 3691-2

ISO/TC **110**/SC **2** Secretariat: **SIS**

Voting begins on: **2021-10-22**

Voting terminates on: **2022-01-14**

Industrial trucks — Safety requirements and verification —

Part 2: Self-propelled variable-reach trucks

Chariots de manutention — Exigences de sécurité et vérification —

Partie 2: Chariots automoteurs à portée variable

ICS: 53.060

This document is circulated as received from the committee secretariat.

ISO/CEN PARALLEL PROCESSING

Reference number
ISO/DIS 3691-2:2021(E)

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Published in Switzerland

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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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 110, *Industrial trucks*, Subcommittee SC 2, *Safety of powered industrial trucks*.

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

European foreword

This document (EN ISO 3691-2:202X) has been prepared by Technical Committee ISO/TC 110 “Industrial trucks” in collaboration with Technical CEN/TC 150 “Industrial Trucks - Safety” the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.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 supersedes EN ISO 3691-2:2016 and is intended to be used in conjunction with EN 16307-2:20XX with which it forms a package to ensure aligned DOW.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, 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.

Introduction

General

This document is a type-C standard as stated in 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 ISO 3691 series of standards covers safety requirements and their verification for industrial trucks as defined in ISO 5053-1.

This part of ISO 3691 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 ISO 12100.

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 kinds of trucks (see Foreword) and on the other side independent standards to cover the respective specific functions of industrial trucks, e.g. visibility, noise, vibration, electrical requirements, etc.

Legislative situation/Vienna Agreement

From the very beginning, the task of the working group was to revise ISO 3691:1980 and establish worldwide basic standards to comply 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 with most of the issues. For several potential problem areas compromises were needed and will be needed in the future. Where divergent regional requirements remain, these are addressed by EN 16307-2:20XX and ISO/TS 3691-8.

In order to ensure that the revised International Standard will be actively used in the ISO member countries, worldwide, procedures will be necessary to replace the existing national standards and technical regulations by the revised International Standard. In the European Community, ISO and the European Committee for Standardization (CEN) agreed on technical co-operation under the Vienna Agreement, with the aim of replacing European Standards (EN) by International Standards. Other countries are asked to make similar agreements to ensure that their national standards and technical regulations are replaced by this International Standard.

Only by these actions will there be the guarantee that products in accordance with International Standards can be shipped worldwide freely without any technical barriers.

Industrial trucks — Safety requirements and verification —

Part 2: Self-propelled variable-reach trucks

1 Scope

This part of ISO 3691 gives safety requirements and the means for their verification for self-propelled industrial variable-reach trucks and variable-reach container handlers/reach stackers as defined in ISO 5053-1 (hereafter referred to as trucks), equipped with forks or integral load-handling devices for normal industrial duties (e.g. fork arms or means, such as spreaders, for handling containers).

It is not applicable to

— rough-terrain variable-reach trucks,

— rough-terrain variable-reach trucks for handling containers,

— machines designed primarily for earth-moving (e.g. loaders and dozers), even when their buckets and blades are replaced with forks,

— machines from which the load can swing freely in all directions.

For the purposes of this part of ISO 3691, fork arms and integrated attachments are considered to be a part of the truck, whereas attachments/equipment/tools mounted on the load carrier or on the fork arms which are removable by the user are not. Nevertheless, for interchangeable equipment, which is assembled with the truck by the operator in order to change the function of, or attribute a new function to, the truck, this document does provide requirements for: — the interface with the truck,

— protection of the operator in the normal operating position from crushing and shearing hazards,

— operating and maintenance instructions,

— load charts,

— marking,

— provision for transportation, and,

— indicator lights for attachments for lifting containers

Any regional requirements additional to the provisions of this part of ISO 3691 are addressed in EN 16307-2:20XX and ISO/TS 3691-8.

This part of ISO 3691 deals with all significant hazards, hazardous situations or hazardous events, as listed in Annex B, with the exception of the following, relevant to the applicable machines when used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer.

It does not establish requirements for hazards that can occur

— during construction,

— when using trucks on public roads,

— when operating in potentially explosive atmospheres,

— when lifting persons, or

— during dismantling, disabling and scrapping.

This standard does not provide requirements for:

— tools, lifting accessories or removeable attachments, which do not change the function or attribute a new function, mounted on the load carrier or fork arms

— attachments/equipment mounted on the load carrier or on the fork arms which are removable by the user and which change the function or attribute a new function, except as stated above,

— the reliability of control systems and performance requirements for safety related parts of control systems, or

— the requirement for fitting an enclosed cab, whether pressurised or not.

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.

ISO 2328:2011, *Fork-lift trucks — Hook-on type fork arms and fork arm carriages — Mounting dimensions*

ISO 2330:2002, *Fork-lift trucks — Fork arms — Technical characteristics and testing*

ISO 2867:2011, *Earth-moving machinery — Access systems*

ISO 3287:1999, *Powered industrial trucks — Symbols for operator controls and other displays*

ISO 3411:2007, *Earth-moving machinery — Physical dimensions of operators and minimum operator space envelope*

ISO 3795:1989, *Road vehicles, and tractors and machinery for agriculture and forestry — Determination of burning behaviour of interior materials*

ISO 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

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

ISO 5353:1995, *Earth-moving machinery, and tractors and machinery for agriculture and forestry — Seat index point*

ISO 6055:2004, *Industrial trucks — Overhead guards — Specification and testing*

ISO 6292:2020, *Powered industrial trucks and tractors — Brake performance and component strength*

ISO 10263-2:2009, *Earth-moving machinery — Operator enclosure environment — Part 2: Air filter element test method*

ISO 10263-3:2009, *Earth-moving machinery — Operator enclosure environment — Part 3: Pressurization test method*

ISO 10263-4:2009, *Earth-moving machinery — Operator enclosure environment — Part 4: Heating, ventilating and air conditioning (HVAC) test method and performance*

ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13284:2003, *Fork-lift trucks — Fork-arm extensions and telescopic fork arms — Technical characteristics and strength requirements*

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

ISO 15870:2000, *Powered industrial trucks — Safety signs and hazard pictorials — General principles*

ISO 15871:2019, *Industrial trucks — Specifications for indicator lights for container handling and grappler arm operations*

ISO 21281:2005, *Construction and layout of pedals of self-propelled sit-down rider-controlled industrial trucks — Rules for the construction and layout of pedals*

ISO 22915-1:2016, *Industrial trucks — Verification of stability — Part 1: General*

ISO 22915-10:2008, *Industrial trucks — Verification of stability — Part 10: Additional stability test for trucks operating in the special condition of stacking with load laterally displaced by powered devices*

ISO 22915-11:2011, *Industrial trucks — Verification of stability — Part 11: Industrial variable-reach trucks*

ISO 22915-12:2015, *Industrial trucks — Verification of stability — Part 12: Industrial variable-reach trucks handling freight containers of 6 m (20 ft) length and longer*

ISO 22915-20:2008, *Industrial trucks — Verification of stability — Part 20: Additional stability test for trucks operating in the special condition of offset load, offset by utilization*

ISO 24135-1:2006, *Industrial trucks — Specifications and test methods for operator restraint systems — Part 1: Lap-type seat belts*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5053-1:2020 and ISO 12100:2010, and the following apply.

3.1
self-propelled industrial variable-reach truck
seated-rider-operated, counterbalanced lift truck with one or more articulated arms, telescopic, non-slewing, used for stacking loads and for operation on smooth, level, prepared and consolidated surfaces

3.2
actual capacity at maximum lift height with forks
maximum load, Q_2, specified by the manufacturer that the truck is capable of lifting to its maximum height in normal operating conditions

Note 1 to entry: It is equal to the maximum load, with centre of gravity G (see Figure A.1), carried on the *fork arms* (3.7) at the standard load centre distance, *D*, as specified in Annex A, and with the *boom* (3.9) adjusted to its maximum height. It is expressed in kilograms.

3.3
actual capacity at container position with spreader
maximum load, *Q*, with row (*d*) and height (*h*), specified by the manufacturer that the truck is capable of lifting to its maximum height in normal operating conditions

3.4
axle locking
mechanism designed to stop oscillation of the rear axle so as to improve truck stability

3.5
stabilizer
extendable or pivoting mechanical supports used to improve stability of a stationary truck

3.6
lateral levelling
act of changing the angular relationship between the boom pivot and the ground in order to adjust the boom pivot to horizontal when the truck is standing on a side slope

Note 1 to entry: Used to ensure that the *boom* (3.9) operates in a vertical plane.

3.7
fork arms
device consisting of two or more solid forks, hook-mounted or shaft-mounted, that is fitted on the carriage and usually spread manually

3.8
fork arm extension
device fitted over the *fork arms* (3.7) to increase their length

3.9
boom
pivoting support member providing radial and telescoping (if equipped) movement of the load-engaging means

3.10
spreader
device fitted to the *boom* (3.9), designed to connect the lifting points of freight containers, swap bodies and semi-trailers

Note 1 to entry: It can include powered devices used to connect the lifting points of the load and an articulated mechanism to facilitate engagement.

3.11
bucket
device intended for carrying bulk products such as sand, gravel or coal

3.12
overhead guard
device fitted to the truck for the purpose of protecting the operator against falling objects

3.13
load backrest
portion of the fork carriage serving to restrain the load when the load is tilted rearward or upward

3.14
normal operating position
position in which the operator is able to control all functions for driving and load handling as defined by the manufacturer

Note 1 to entry: Additional positions may be defined by the manufacturer if it is not possible to control all the functions of the truck from a single position. A rotating seat or stand-up end-control truck with more than one operating direction is considered as being or having a single operating position.

3.15
fork carrier
device fitted at the end of the *boom* (3.9) to connect and lock interchangeable attachments without the use of a tool

3.16
auxiliary mast
mast at the end of the *boom* (3.9) intended for reaching greater lifting heights

Note 1 to entry: Referred to simply as *mast* in this part of ISO 3691.

3.17
non-slewing
having a slewing movement not greater than 5° on either side of the longitudinal axis of the truck

Note 1 to entry: See Figure 1.

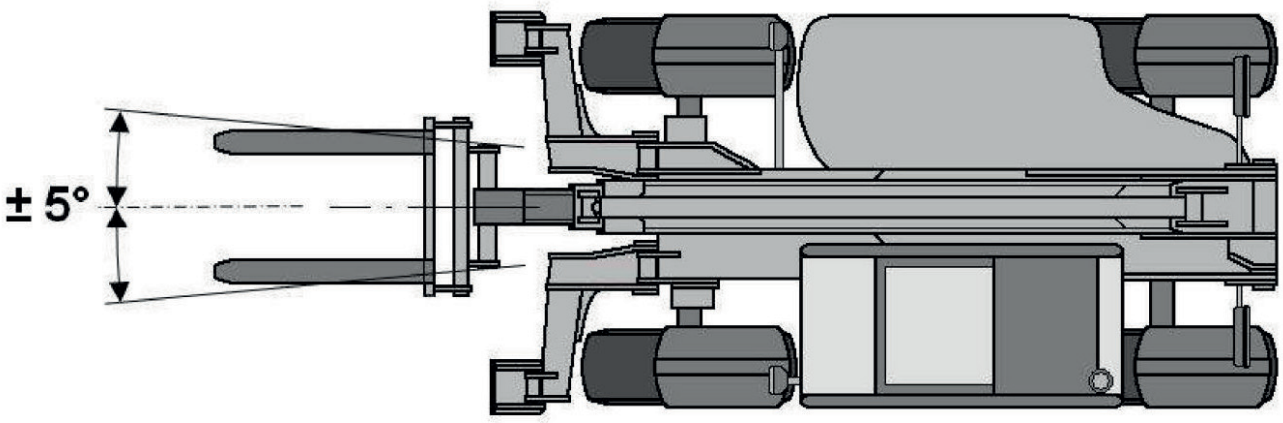

Figure 1 — Slewing movement ≤ 5° (non-slewing)

3.18
rated capacity with fork arms
load, Q_1, in kilograms, permitted by the manufacturer that the truck type is capable of transporting and lifting in normal operating conditions with the boom fully retracted

Note 1 to entry: For centre of gravity G.

Note 2 to entry: The rated capacity is used to compare the capacity of different manufacturers' trucks and to provide the break points used in technical standards and statistics. The operating limits for the truck are defined by the *actual capacity* (3.2, 3.3).

3.19
rated capacity with spreader
load, Q_1, in kilograms, permitted by the manufacturer that the truck type is capable of transporting and lifting in normal operating conditions with the spreader in the position of the first container row at measurement d_1 and lift height 6,5 m

Note 1 to entry: For the second container, see Figure A.2.

4 Safety requirements and/or protective measures

4.1 General

4.1.1 Overall requirements

The truck shall comply with the safety requirements and/or protective measures of this clause.

In addition, the truck shall be designed according to the principles of ISO 12100:2010 for relevant but not significant hazards which are not dealt with by this document.

4.1.2 Normal climatic conditions

For truck operation, the following climatic conditions apply:

— average ambient temperature for continuous duty: + 25 °C;