
**Industrial trucks — Safety requirements
and verification —**

**Part 5:
Pedestrian-propelled trucks**

Chariots de manutention — Exigences de sécurité et vérification —

Partie 5: Chariots à conducteur accompagnant

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 3691-5 was prepared by Technical Committee ISO/TC 110, *Industrial trucks*, Subcommittee SC 2, *Safety of powered industrial trucks*.

This first edition of ISO 3691-5, together with ISO 3691-1, ISO 3691-2, ISO 3691-3, ISO 3691-4, ISO 3691-6, ISO/TS 3691-7 and ISO/TS 3691-8, cancels and replaces ISO 3691:1980, of which it constitutes a technical revision.

ISO 3691 consists of the following parts, under the general title *Industrial trucks — Safety requirements and verification*:

- *Part 1: Self-propelled industrial trucks, other than driverless, variable-reach and burden-carrier trucks*
- *Part 2: Self-propelled variable-reach trucks*
- *Part 3: Additional requirements for trucks with elevating operator position and trucks specifically designed to travel with elevated loads*
- *Part 4: Driverless industrial trucks and their systems*
- *Part 5: Pedestrian-propelled trucks*
- *Part 6: Burden and personnel carriers*
- *Part 7: Regional requirements for countries within the European Community* [Technical Specification]
- *Part 8: Regional requirements for countries outside the European Community* [Technical Specification]

Introduction

General

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

The machinery 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.

For the purposes of the ISO 3691 series of standards, industrial trucks are wheeled, self-propelled or manually driven vehicles, except for those running on rails. They are operator-controlled and are designed to carry, tow, push, lift, stack or tier in racks.

Structure

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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.

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.

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

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.

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 ISO/TS 3691-7 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 are 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.

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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.

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Industrial trucks — Safety requirements and verification —

Part 5: Pedestrian-propelled trucks

1 Scope

This part of ISO 3691 gives safety requirements and the means for their verification for the following types of pedestrian-propelled trucks (hereafter referred to as *trucks*), equipped with load-handling devices for normal industrial duties, e.g. fork arms and platforms, or integrated attachments for special applications:

- pedestrian-propelled straddle stackers,
- pallet stackers,
- industrial trucks with capacities not exceeding 1 000 kg with manual or electrical battery-powered lifting,
- low-lift pallet trucks with lift height up to 300 mm and rated capacity up to 2 300 kg,
- scissor-lift pallet trucks with lift heights up to 1 000 mm or rated capacity up to 1 000 kg with manual or electrical battery-powered lifting.

It is applicable to trucks provided with either manual or electrical battery-powered lifting, operating on smooth, level, hard surfaces.

NOTE On-board battery chargers are considered to be part of the truck. Attachments mounted on the load-carrier or on the fork arms which are removable by the user are not considered to be part of the truck.

This part of ISO 3691 deals with significant hazards, hazardous situations and events relevant to the applicable machines when used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4).

It does not establish the additional requirements for

- a) climatic conditions,
- b) operation in severe conditions (e.g. extreme environmental conditions such as freezer applications, high temperatures, corrosive environments, strong magnetic fields),
- c) electromagnetic compatibility (emission/immunity),
- d) handling of loads the nature of which could lead to dangerous situations (e.g. molten metal, acids/alkalis, radiating materials, especially brittle loads),
- e) handling suspended loads which may swing freely handling,
- f) use on public roads,
- g) direct contact with foodstuffs,
- h) operation on gradients or on surfaces other than smooth, level, hard surfaces,

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- i) lifting systems using belts,
- j) lifting of persons,
- k) trucks with overturning moment greater than 40 000 N·m,
- l) scissor-lift trucks whose lifting is powered by external means (electric, pneumatic),
- m) roll containers,
- n) trucks that are intended to be towed by powered vehicles,
- o) trucks designed for special applications (e.g. hospitals, restaurant trolleys),
- p) winch-operated trucks,
- q) mobile lifting tables.

Hazards relevant to noise, vibration and visibility are not significant and are not dealt with in this part of ISO 3691.

Regional requirements, additional to those given in this part of ISO 3691, are addressed in ISO/TS 3691-7.

2 Normative references

The following referenced documents are indispensable for the application 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.

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

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

ISO 5053, *Powered industrial trucks — Terminology*

ISO 12100-1, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology*

ISO 12100-2, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles*

ISO 13857, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

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

ISO 20898, *Industrial trucks — Electrical requirements*

3 Terms and definitions

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

3.1 stacker truck

masted truck without tilt, with load-bearing outriggers, equipped with fork arms, a platform or other load-handling device, designed to be manually pushed, pulled and steered by one pedestrian operator

NOTE The load can be raised by either manual means or battery power.

3.1.1**straddle stacker**

stacking truck with outriggers, equipped with fork arms that are located between the outriggers

3.1.2**pallet stacker**

stacking truck where the fork arms extend over the outriggers

3.2**pallet truck**

truck with wheels supporting lifting fork arms for handling pallets, designed to be manually pushed, pulled and steered, on a smooth, level, hard surface by a pedestrian operator using an articulated tiller and designed to raise a load by pumping the tiller to a height sufficient for transporting

3.3**pedestrian-propelled industrial scissor-lift pallet truck**

truck without a mast, with three or more wheels and with two fork arms or a platform, with a scissor lifting mechanism, a wheel base that varies with the lift height and lateral stabilizers, operating on a smooth, level, hard surface and designed to be manually pushed, pulled and steered by one pedestrian operator using an articulated tiller

3.4**actual capacity**

maximum load in kilograms, established by the manufacturer based on component strength and truck stability, which the truck can carry, lift and stack to a specified height, at a specified load centre distance and reach, if applicable, in normal operation

NOTE The actual capacity depends on the configuration of the truck in terms of such variables as the type and lift height of the mast fitted, the actual load centre and any attachments that may be fitted. Additional actual capacity ratings with removable attachments can also be established where permitted by the appropriate stability tests or by calculation using empirical data.

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3.5**rated capacity of removable attachments**

maximum load in kilograms and load centre distance, where applicable, established by the manufacturer of the attachment, which the attachment is capable of handling in normal operating conditions as specified by the manufacturer

NOTE For determination, see Annex B.

3.6**rated capacity**

(of a stacker truck) maximum load in kilograms given by the manufacturer, based on component strength and truck stability, that the truck can carry, lift and stack to a standard lift height, at a standard load centre in normal position

NOTE 1 Where a truck does not lift to the standard lift height, H , it is given a rated capacity at its maximum lift height. For determination, see Annex B.

NOTE 2 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. It gives the load that the truck type is capable of transporting or lifting under the above conditions. The safe operating limits for the truck are defined by its actual capacity (see ISO 3691-1).

3.7**normal operating position**

position in which the operator shall be able to control all functions for load handling as defined by the manufacturer

3.8 normal operation

intended use for which the truck is designed, according to the manufacturer's specification and defined in the instruction handbook

4 List of significant hazards

This list contains all the significant hazards, hazardous situations and events, as far as they deal with this part of ISO 3691, identified by risk assessment of industrial trucks and which require action to eliminate or reduce the risk.

No.	Type or group/origin	Potential consequences		Corresponding requirement
1	Mechanical hazards			
	<ul style="list-style-type: none"> — Acceleration, deceleration (kinetic energy) — Machinery mobility — Moving elements — Rotating elements 	<ul style="list-style-type: none"> — Being run over — Being thrown — Crushing — Drawing-in or trapping — Impact 	<ul style="list-style-type: none"> 5.2 5.3.1 5.3.2 5.3.3 5.4.3.1 5.4.3.6 5.4.6.1 5.5.009 5.11.2 6 7 	<ul style="list-style-type: none"> Propelling, steering Load-handling controls — General Control with a device on the tiller Control with a device not located on the tiller Limitation of stroke Failure of energy supply of hydraulic circuit Disengagement of the attachment Parking brake Electrical systems and equipment Verification of safety requirements and/or measures Information for use
	<ul style="list-style-type: none"> — Angular parts — Approach of a moving element to a fixed part — Cutting parts — Sharp edges 	<ul style="list-style-type: none"> — Crushing — Cutting or severing — Drawing-in or trapping — Entanglement — Shearing — Stabbing or puncture 	<ul style="list-style-type: none"> 5.2 5.8 5.9 5.10 6 7 	<ul style="list-style-type: none"> Propelling, steering Protection against crushing, shearing and entanglement points Edges and angles Protective devices Verification of safety requirements and/or measures Information for use

No.	Type or group/origin	Potential consequences	Corresponding requirement	
	— Falling objects	<ul style="list-style-type: none"> — Crushing — Impact 	<ul style="list-style-type: none"> 5.4.1 5.4.2 5.4.3.1 5.4.3.2 5.4.3.4 5.4.3.5 5.4.4 5.4.5 5.4.6 5.6 5.7 5.10.4 5.12 6 	<ul style="list-style-type: none"> Chain system Wire rope system Limitation of stroke Load supporting Hydraulic circuit Lowering speed limitation Fork arms and platforms — Stacker trucks only Fork carriers — Stacker trucks only Load handling attachments — Stacker trucks only Stability Lateral stabilizers Pallet handling Lifting points Verification of safety requirements and/or measures Information for use
	— High pressure	— Injection	<ul style="list-style-type: none"> 5.4.3.3 5.4.3.4 6 7 	<ul style="list-style-type: none"> Pressure relief valves Hydraulic circuit Verification of safety requirements and/or measures Information for use
	— Stability	<ul style="list-style-type: none"> — Being thrown — Crushing — Impact 	<ul style="list-style-type: none"> 5.6 5.7 5.12 6 7 	<ul style="list-style-type: none"> Stability Lateral stabilizers Lifting points Verification of safety requirements and/or measures Information for use

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