DD ISO/TS 3691-7:2011

BSI Standards Publication

Industrial trucks — Safety requirements and verification

Part 7: Regional requirements for countries within the European Community

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National foreword

This Draft for Development is the UK implementation of ISO/TS 3691-7:2011.

This publication is not to be regarded as a British Standard.

It is being issued in the Draft for Development series of publications and is of a provisional nature. It should be applied on this provisional basis, so that information and experience of its practical application can be obtained.

Comments arising from the use of this Draft for Development are requested so that UK experience can be reported to the international organization responsible for its conversion to an international standard. A review of this publication will be initiated not later than 3 years after its publication by the international organization so that a decision can be taken on its status. Notification of the start of the review period will be made in an announcement in the appropriate issue of *Update Standards.*

According to the replies received by the end of the review period, the responsible BSI Committee will decide whether to support the conversion into an international Standard, to extend the life of the Technical Specification or to withdraw it. Comments should be sent to the Secretary of the responsible BSI Technical Committee at British Standards House, 389 Chiswick High Road, London W4 4AL.

The UK participation in its preparation was entrusted to Technical Committee MHE/7, Industrial trucks.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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Part 7: Regional requirements for countries within the European Community

Chariots de manutention — Exigences de sécurité et vérification —

Partie 7: Exigences régionales pour les pays de la Communauté européenne

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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.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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/TS 3691-7 was prepared by Technical Committee ISO/TC 110, *Industrial trucks*, Subcommittee SC 2, *Safety of powered industrial trucks*.

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 trucks, variable-reach trucks 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

The ISO 3691 series has been developed to provide globally relevant International Standards for industrial trucks. This goal was achieved with most of the issues. Where divergent regional requirements remain, these are addressed by this part of ISO 3691 and by ISO/TS 3691-8.

This part of ISO 3691 addresses those legal requirements related to European Directives which could not be accepted worldwide; ISO/TS 3691-8 addresses requirements related to regulations in force in other countries that are not applicable elsewhere.

Annex A presents a list of significant hazards not covered exhaustively by ISO 3691-1, ISO 3691-2, ISO 3691-3, ISO 3691-4, ISO 3691-5 or ISO 3691-6.

This part of ISO 3691 does not repeat all the technical rules which are state of the art and are applicable to the material used to construct the industrial truck. For these, see ISO 12100.

Industrial trucks — Safety requirements and verification —

Part 7: Regional requirements for countries within the European Community

1 Scope

This part of ISO 3691 gives regional requirements specific to the countries within the European Community (EC) and European Economic Area (EEA) for the types of industrial trucks specified in the scopes of ISO 3691-1, ISO 3691-2, ISO 3691-3, ISO 3691-4, ISO 3691-5 and ISO 3691-6, respectively.

Additional significant hazards, not covered by the above-mentioned parts of ISO 3691, are defined in Annex A.

It is intended to be used in conjunction with each of those parts of ISO 3691.

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 3691-1:2011, *Industrial trucks — Safety requirements and verification — Part 1: Self-propelled industrial trucks, other than driverless trucks, variable-reach trucks and burden-carrier trucks*

ISO 3691-2:—[1)], *Industrial trucks — Safety requirements and verification — Part 2: Self-propelled variable-reach trucks*

ISO 3691-3:—[1)], *Industrial trucks — Safety requirements and verification — Part 3: Additional requirements for trucks with elevating operator position and trucks specifically designed to travel with elevated loads*

ISO 3691-4:—[1)], *Industrial trucks — Safety requirements and verification — Part 4: Driverless industrial trucks and their systems*

ISO 3691-5:2009, *Industrial trucks — Safety requirements and verification — Part 5: Pedestrian-propelled trucks*

ISO 3691-6:—[1)], *Industrial trucks — Safety requirements and verification — Part 6: Burden and personnel carriers*

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

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

ISO/TR 11688-1:1995, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning*

1) To be published.

ISO 13564-1—[2)], *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*

ISO 22915-21:2009, *Industrial trucks — Verification of stability — Part 21: Order-picking trucks with operator position elevating above 1 200 mm*

EN 360:2002, *Personal protective equipment against falls from a height — Retractable type fall arresters*

EN 361:2002, *Personal protective equipment against falls from a height — Full body harnesses*

EN 363:2008, *Personal fall protection equipment — Personal fall protection systems*

EN 795:1996, *Protection against falls from a height — Anchor devices — Requirements and testing*, together with Amendment 1, 2000

EN 953:1997, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards,* together with Amendment 1, 2009

EN 1175-1:1998, *Safety of industrial trucks — Electrical requirements — Part 1: General requirements for battery powered trucks*, together with Amendment 1, 2010

EN 1175-2:1998, *Safety of industrial trucks — Electrical requirements — Part 2: General requirements for internal combustion engine powered trucks*, together with Amendment 1, 2010

EN 1175-3:1998, *Safety of industrial trucks — Electrical requirements — Part 3: Specific requirements for the electric power transmission systems of internal combustion engine powered trucks*, together with Amendment 1, 2010

EN 1755:2000, *Safety of industrial trucks — Operation in potentially explosive atmospheres — Use in flammable gas, vapour, mist and dust*, together with Amendment 1, 2009

EN 12053:2001, *Safety of industrial trucks — Test methods for measuring noise emissions*, together with Amendment 1, 2009

EN 12895, *Industrial trucks — Electromagnetic compatibility*

EN 13059:2002, *Safety of industrial trucks — Test methods for measuring vibration, together with Amendment 1, 2008*

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

EN 15000:2008, *Safety of industrial trucks — Self-propelled variable reach trucks — Specification, performance and test requirements for longitudinal load moment indicators and longitudinal load moment limiters*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5053, ISO 3691-1, ISO 3691-2, ISO 3691-3, ISO 3691-4, ISO 3691-5 and ISO 3691-6 apply.

2) To be published.

4 Safety requirements and/or protective measures

4.1 European requirements additional to ISO 3691-1

4.1.1 General

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

4.1.2 Electrical requirements

Electrical systems and equipment shall be in accordance with EN 1175-1, EN 1175-2 and EN 1175-3.

4.1.3 Travel speed

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.

See ISO 3691-1:2011, 4.2.3.

4.1.4 Brakes

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.

See ISO 3691-1:2011, 4.3.1.

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

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;

— the braking function shall be automatically applied when travel control device is released.

See ISO 3691-1:2011, 4.4.2.7.

4.1.6 Lift chains

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

— for trucks $\leqslant$ 10 000 kg rated capacity:

$K_1 \geqslant 5$

— for trucks > 10 000 kg rated capacity:

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

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

See ISO 3691-1:2011, 4.6.1.

4.1.7 Mast tilt and carriage isolation

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.

See ISO 3691-1:2011, 4.6.3.5.

4.1.8 Operator's seat

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

See ISO 3691-1:2011, 4.7.4.

4.1.9 Protection against crushing, shearing and trapping

4.1.9.1 General

Where fixed and/or removable guard systems are needed, the requirements of EN 953 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.

See ISO 3691-1:2011, 4.7.7.1.

4.1.9.2 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.

4.1.10 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.

See ISO 3691-1:2011, 4.8.1.

4.1.11 Lateral stability

NOTE The European standard under development, prEN 16203, provides the procedure for performing dynamic tests for the verification of lateral stability while travelling, applicable for counterbalanced lift trucks that have a centre control, sit-down, non-elevating operator, with a rated capacity up to and including 5 000 kg.

See ISO 3691-1:2011, 4.8.1.

4.1.12 Visibility

See ISO 3691-1:2011, 4.10.1, which makes normative reference to ISO 13564-1.

Replace the requirement given in ISO 13564-1:—, 9.2.2 a) 1) 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 minimum illuminated area of the test surface required by ISO 13564-1:—, Table 3, Test No.1, with the following:

25 % of the vertical surface of the test body

4.1.13 Reduction of noise by design

4.1.13.1 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 ISO 11688-1 shall be considered.

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

Normally, noise is not a significant hazard for battery-powered trucks.

4.1.13.2 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.

4.1.13.3 Measures to reduce noise at the operator's position

Typical measures to reduce noise include the following:

— selection of low-noise components;

— use of elastic mountings that prevent the transmission of structure-borne 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.

4.1.13.4 Determination of noise emission values

The values of noise emissions shall be measured using the test method given in EN 12053.

4.1.14 Vibration

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

4.1.15 Electromagnetic compatibility (EMC)

The truck's EMC shall comply with EN 12895.

4.1.16 Operation in potentially explosive atmospheres

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

4.2 European requirements additional to ISO 3691-2

4.2.1 General

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

4.2.2 Electrical requirements

Electrical systems and equipment shall be in accordance with EN 1175-1, EN 1175-2 and EN 1175-3.

4.2.3 Operator's seat

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

See ISO 3691-2:—, 4.7.2.

4.2.4 Protection against crushing, shearing and trapping

Where fixed and/or removable guard systems are needed, the requirements of EN 953 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.

See ISO 3691-2:—, 4.7.6.

4.2.5 Longitudinal stability determination

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

See ISO 3691-2:—, 4.8.3.

4.2.6 Reduction of noise by design

4.2.6.1 General

Variable-reach 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 in ISO/TR 11688-1 shall be considered.

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

Normally noise is not a significant hazard for battery-powered trucks.

4.2.6.2 Main source of noise

On variable-reach 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.

4.2.6.3 Measures to reduce noise at the operator's position

Typical measures to reduce noise include the following:

— selection of low-noise components;

— use of elastic mountings that prevent the transmission of structure-borne 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.

4.2.6.4 Determination of noise emission values

The values of noise emissions shall be measured using the test method given in EN 12053.

4.2.7 Vibration

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

4.2.8 Electromagnetic compatibility (EMC)

The truck's EMC shall comply with EN 12895.

4.2.9 Operation in potentially explosive atmospheres

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

4.3 European requirements additional to ISO 3691-3

4.3.1 General

The following applies to trucks with elevating operator positions and those specifically designed to travel with elevated loads dealt with in ISO 3691-3. These are additional to the requirements of ISO 3691-3 and, in certain instances, replace them.

4.3.2 Operation without guidance systems

For trucks travelling at more than 9 km/h, the braking capacity shall comply with ISO 6292:2008, Table 2, Group A1 or, alternatively, the travel speed shall be automatically reduced to not more than 9 km/h and braking capacity shall comply with of ISO 6292:2008, Table 2, group C.

4.3.3 Operator fall protection

As an exception to the provisions of ISO 3691-1:2011, 4.7.3.1 and 4.7.3.2, normatively referenced in ISO 3691-3, the operator platforms may be equipped with a fall protection device in lieu of guarding all round, provided the truck is intended for use in particular circumstances (e.g. handling of bulky loads) where it is not suitable to use guard rails.

The fall protection device shall consist of a body harness and retractable, automatically locking tether system in accordance with EN 363, a body harness in accordance with EN 361, a connecting device in accordance with EN 795, Class D, and an automatic locking tether in accordance with EN 360.

4.3.4 Stability of order-picking trucks with elevating operator position

If the travel speed is reduced to creep speed ($v \leqslant 2{,}5$ km/h) while travelling with load and in unrestricted steering mode (see ISO 22915-21:2009, Table 1, Test 3), the lateral stability is considered to have been verified if the truck reaches a minimum tilt table angle of 6 %.

If the travel speed is reduced to creep speed ($v \leqslant 2{,}5$ km/h) while travelling without load and in unrestricted steering mode (see ISO 22915-21:2009, Table 1, Test 4) the lateral stability is considered to have been verified if the truck reaches a minimum tilt table angle of 8 %.

See ISO 3691-3:—, 4.5.

4.4 European requirements additional to ISO 3691-4

4.4.1 General

The following applies to the driverless industrial trucks and their systems dealt with in ISO 3691-4. These are additional to the requirements of ISO 3691-4 and, in certain instances, replace them.

4.4.2 Electrical requirements

Electrical systems and equipment shall be in accordance with EN 1175-1.

4.4.3 Electromagnetic compatibility (EMC)

The truck's EMC shall comply with EN 12895.

4.4.4 Operation in potentially explosive atmospheres

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

4.5 European requirements additional to ISO 3691-5

4.5.1 General

The following applies to the pedestrian-propelled trucks dealt with in ISO 3691-5. These are additional to the requirements of ISO 3691-5 and, in certain instances, replace them.

4.5.2 Protection against crushing, shearing and trapping

4.5.2.1 General

Where fixed and/or removable guard systems are needed the requirements of EN 953 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.

See ISO 3691-5:2009, 5.8.

4.5.2.2 Pedestrian-propelled trucks with mast

The mast shall be guarded on 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.

4.5.3 Electrical requirements

Electrical systems and equipment shall be in accordance with EN 1175-1.

4.5.4 Electromagnetic compatibility (EMC)

The truck's EMC shall comply with EN 12895.

4.5.5 Operation in potentially explosive atmospheres

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

4.6 European requirements additional to ISO 3691-6

4.6.1 General

The following applies to the burden and personnel carriers dealt with in ISO 3691-6. These are additional to the requirements of ISO 3691-6 and, in certain instances, replace them.

4.6.2 Electrical requirements

Electrical systems and equipment shall be in accordance with EN 1175-1, EN 1175-2 and EN 1175-3.

See ISO 3691-6:—, 4.1.3.

4.6.3 Brakes

The truck shall be provided with an emergency brake in accordance with ISO 6292:2008, 4.3.

See ISO 3691-6:—, 4.3.

4.6.4 Operator's seat

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

See ISO 3691-6:—, 4.6.3.1.

4.6.5 Protection from burning

The carrier shall provide a space for the location of a fire extinguisher.

See ISO 3691-6:—, 4.6.4.

4.6.6 Protection against crushing, shearing and trapping

Where fixed and/or removable guard systems are needed the requirements of EN 953 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.

See ISO 3691-6:—, 4.6.5.

4.6.7 Visibility

See ISO 3691-6:—, 4.9.1, which makes normative reference to ISO 13564-1.

Replace the requirement given in ISO 13564-1:—, 9.2.2 a) 1) 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:—, Table 3, Test No.1, with the following:

25 % of the vertical surface of the test body

4.6.8 Reduction of noise by design

4.6.8.1 General

Burden and personnel carriers 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 in ISO/TR 11688-1 shall be considered.

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

Normally, noise is not a significant hazard for battery-powered trucks.

4.6.8.2 Main source of noise

On burden and personnel carriers, 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.

4.6.8.3 Measures to reduce noise at the operator's position

Typical measures to reduce noise include the following:

— selection of low-noise components;

— use of elastic mountings that prevent the transmission of structure-borne 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.

4.6.8.4 Determination of noise emission values

The values of noise emissions shall be measured using the test method given in EN 12053.

4.6.9 Vibration

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

4.6.10 Electromagnetic compatibility (EMC)

The truck's EMC shall comply with EN 12895.

4.6.11 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 standard and the principles defined in ISO 3691-1:2011, Clause 5.

6 Information for use

6.1 Instruction handbook(s)

6.1.1 Truck/attachments

In addition to the elements given in ISO 3691-1:2011, 6.2.1, ISO 3691-2:—, 6.2.1, and ISO 3691-6:—, 6.1.1, 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 the lifting accessory.

6.1.2 Operation of truck

In addition to the elements given in the “Instruction handbook” subclause of ISO 3691-1, ISO 3691-2, ISO 3691-4, ISO 3691-5 and ISO 3691-6, respectively, 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

Further to ISO 3691-1:2011, 6.2.6 c), the instruction handbook(s) shall include, as applicable, the procedure for truck mounting.

6.2 Marking

6.2.1 Information plates

Replace ISO 3691-1:2011, 6.3.1.1 b), ISO 3691-2:—, 6.3.1.1 b), ISO 3691-5:2009, 7.3.3.1 b) and ISO 3691-6:—, 6.3.1 b) with the following:

— designation of the machinery and the mandatory marking[3)].

3) For industrial trucks intended to be put on the market in the EEA, CE marking as defined in the applicable European directive(s), e.g. Machinery, Outdoor Noise and Explosive Atmospheres (ATEX).

Annex A
(informative)

List of significant hazards

This list contains all the significant hazards, hazardous situations and events, as far as they are dealt with in this part of ISO 3691, identified by risk assessment of industrial trucks and which require action to eliminate or reduce the risk. See Table A.1.

The hazards listed here are additions to the listed significant hazards in ISO 3691-1, ISO 3691-2, ISO 3691-3, ISO 3691-4, ISO 3691-5 or ISO 3691-6.

NOTE The structure of the table is based on that of ISO 14121-1:2007, Table A.1. The order of lines within a group corresponds to the truck functionalities.

Table A.1 — List of significant hazards

No.	Type or group/origin	Potential consequences	Corresponding requirement	
1	**Mechanical hazards**			
	— Acceleration, deceleration (kinetic energy) — Machinery mobility — Moving elements — Rotating elements	— Being run over — Crushing — Drawing-in or trapping — Impact	4.1.3 4.1.4 4.1.5 4.1.6 4.1.7 4.1.12 4.3.2 4.6.3 4.6.7 6.1.1 6.1.2 6.1.3	Travel speed Brakes Additional operation from alongside pedestrian-controlled and stand-on trucks Lift chains Mast tilt and carriage isolation Visibility Operation without guidance systems Brakes Visibility Truck/attachments Operation of truck Transportation, commissioning and storage
	— Angular parts — Approach of a moving element to a fixed part — Cutting parts — Sharp edges	— Crushing — Cutting or severing — Drawing-in or trapping — Entanglement — Shearing — Stabbing or puncture	4.1.9 4.2.4 4.5.2 4.6.6	Protection against crushing, shearing and trapping Protection against crushing, shearing and trapping Protection against crushing, shearing and entanglement Protection against crushing, shearing and trapping
	— Falling objects	— Crushing — Impact	6.1.1	Truck/attachments

Table A.1 (*continued*)

No.	Type or group/origin	Potential consequences	Corresponding requirement	
	— Height from the ground	— Being thrown — Crushing — Drawing-in or trapping — Impact — Slipping, tripping and falling	4.3.3	Operator fall protection
	— Stability	— Being thrown — Crushing — Impact	6.1.1 4.3.4	Truck/attachments Stability of order-picking trucks with elevating operator position
2	**Electrical hazards**			
	— Arc — Electromagnetic phenomena — Electrostatic phenomena — Live parts — Not enough distance to live parts under high voltage — Overload — Parts which have become live under fault conditions — Short-circuit — Thermal radiation	— Burn — Chemical effects — Electrocution — Falling, being thrown — Fire — Projection of molten particles — Shock	4.1.2 4.1.15 4.2.2 4.2.8 4.4.2 4.4.3 4.5.3 4.5.4 4.6.2 4.6.10	Electrical requirements Electromagnetic compatibility Electrical requirements Electromagnetic compatibility Electrical requirements Electromagnetic compatibility Electrical requirements Electromagnetic compatibility Electrical requirements Electromagnetic compatibility
3	**Thermal hazards**			
	No origin of these kind of hazards in industrial trucks is covered.			
4	**Noise hazards**			
	— Exhausting system — Moving parts	— Discomfort — Loss of awareness — Loss of balance — Permanent hearing loss — Stress — Tinnitus — Tiredness	4.1.13 4.1.13.1 4.1.13.2 4.1.13.3 4.1.13.4 4.2.6 4.2.6.1 4.2.6.2 4.2.6.3 4.2.6.4 4.6.8.3 6.1.1	Reduction of noise by design General Main source of noise Measures to reduce noise at the operator's position Determination of noise emission values Reduction of noise by design General Main source of noise Measures to reduce noise at the operator's position Determination of noise emission values Measures to reduce noise at the operator's position Truck/attachments

Table A.1 (*continued*)

No.	Type or group/origin	Potential consequences	Corresponding requirement	
5	**Vibration hazards**			
	— Mobile equipment	— Discomfort — Low-back morbidity — Neurological disorder — Osteo-articular disorder — Trauma of the spine — Vascular disorder	4.1.14 4.2.7 4.6.9 6.1.1	Vibration Vibration Vibration Truck/attachments
6	**Radiation hazards**			
	No origin of these kind of hazards in industrial trucks is covered.			
7	**Material/substance hazards**			
	— Combustible — Explosive — Flammable — Fluid — Fume — Gas	— Explosion — Fire	4.1.16 4.2.9 4.4.4 4.5.5 4.6.11	Operation in potentially explosive atmospheres Operation in potentially explosive atmospheres Operation in potentially explosive atmospheres Operation in potentially explosive atmospheres Operation in potentially explosive atmospheres
8	**Ergonomic hazards**			
	— Design, location or identification of control devices — Effort	— Discomfort — Fatigue — Musculoskeletal disorder — Stress	4.1.8 4.1.12 4.2.3 4.6.4 4.6.7	Operator's seat Visibility Operator's seat Operator's seat Visibility
9	**Hazards associated with environment in which the machine is used**			
	No origin of these kind of hazards in industrial trucks is covered.			
10	**Combination of hazards**			
	No origin of these kind of hazards in industrial trucks is covered.			

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