
Vozila za talni transport - Terenska vozila - Varnostne zahteve in preverjanje - 4. del: Dodatne zahteve za tovornjake z mehanizmom s spremenljivim dosegom za dvigovanje prosto visečih bremen

Rough-terrain trucks - Safety requirements and verification - Part 4: Additional requirements for variable-reach trucks handling freely suspended loads

Geländegängige Stapler - Sicherheitstechnische Anforderungen und Verifizierung - Teil 4: Zusätzliche Anforderungen für Stapler mit veränderlicher Reichweite zum Befördern angehängter Lasten

Chariots tout-terrain - Prescriptions de sécurité et vérification - Partie 4 : Prescriptions supplémentaires pour les chariots à portée-variable manutentionnant des charges suspendues à oscillation libre

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Rough-terrain trucks - Safety requirements and verification - Part 4: Additional requirements for variable-reach trucks handling freely suspended loads

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This European Standard was approved by CEN on 23 November 2020.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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European foreword

This document (EN 1459-4:2020) 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of an identical text or by endorsement, at the latest by June 2021, and conflicting national standards shall be withdrawn at the latest by June 2021.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN 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 2006/42/EC.

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

EN 1459 consists of the following parts, under the general title Rough-terrain trucks — Safety requirements and verification:

Part 1: Variable-reach trucks;

Part 2: Slewing variable-reach trucks;

Part 3: Interface between the variable-reach truck and the work platform;

Part 4: Additional requirements for variable-reach trucks handling freely suspended loads;

Part 5: Additional requirements for attachments and attachment interface;

Part 6: Application of EN ISO 13849-1 to slewing and non-slewing variable-reach rough-terrain trucks;

Part 8: Variable-reach tractors.

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

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EN 1459-4:2020 (E)**Introduction**

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

All quantities are in SI units, and this includes metric units.

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

The machinery concerned and the extent to which hazards, hazardous situations and hazardous events are covered are indicated in the scope of this document.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

1 Scope

This document specifies the safety requirements and means of verification in addition to EN 1459-1:2017+A1:2020 and EN 1459-2:2015+A1:2018 as applicable, for rough-terrain variable-reach trucks (hereafter referred to as trucks) designed and intended for handling suspended loads which can swing freely in one or more directions. It is applicable to trucks covered by EN 1459-1:2017+A1:2020 and EN 1459-2:2015+A1:2018.

This document does not apply to:

- the lifting of suspended loads which by design of the load or the lifting attachments does not allow the load to swing freely in any direction;
- the handling of flexible intermediate bulk containers, as defined in ISO 21898:2004, carried under the forks of the truck or with attachments intended for this purpose;
- any attachments / means used for lifting personnel;
- lifting accessories;
- freight container handling trucks;
- mobile cranes (covered by EN 13000:2010+A1:2014).

This document deals with all significant hazards, hazardous situations or hazardous events, related to trucks handling a freely suspended load, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Annex A).

This document does not deal with load limiter for attachments.

This document is not applicable to rough-terrain variable-reach trucks designed and intended for handling suspended loads manufactured before the date of its publication.

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 1459-1:2017+A1:2020, *Rough-terrain trucks — Safety requirements and verification — Part 1: Variable-reach trucks*

EN 1459-2:2015+A1:2018, *Rough-terrain trucks — Safety requirements and verification — Part 2: Slewing variable-reach trucks*

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

ISO 7000:2019, *Graphical symbols for use on equipment — Registered symbols*

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*

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ISO 22915-14:2010, *Industrial trucks — Verification of stability — Part 14: Rough-terrain variable-reach trucks*

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 22915-24:2015, *Industrial trucks — Verification of stability — Part 24: Slewing variable-reach rough-terrain trucks*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010, EN 1459-1:2017+A1:2020 and EN 1459-2:2015+A1:2018 with 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 <https://www.iso.org/obp>

3.1 lifting attachment
interchangeable equipment mounted to the truck from which a lifting accessory or a load can be suspended

EXAMPLE Jib, hoist

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3.2 jib
device, telescopic or not, intended to extend forward the lifting point of the truck

Note 1 to entry: See Figure 1.

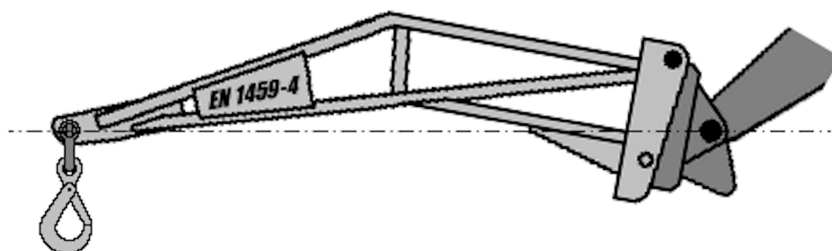


Figure 1 — Example of a jib

3.3 hoist
interchangeable equipment for lifting and lowering suspended loads over predetermined distances, using ropes or chains

3.4**suspended load**

load that can swing freely in one or more direction when attached to a lifting attachment by means of a lifting accessory or a load handling means

EXAMPLE Log clamp

3.5**tether**

simple means used to restrain the dynamic effects of the suspended load

3.6**level ground**

ground with a gradient of $0 \pm 2 \%$

3.7**pick and carry**

act of travelling with a suspended load

3.8**load handling means**

part of the lifting attachment for holding the load or which the load/lifting accessory is attached to

EXAMPLE Hook, grab, clamp

3.9**connection point for lifting accessory**

point on the boom or carriage intended by the manufacturer of the truck for connecting lifting accessories (e.g. shackle and hook)

3.10**truck type**

one or more trucks representative of a given design, technical characteristics and application

Note 1 to entry: A type of truck can be produced in series or as a single unit.

Note 2 to entry: One type of truck can have variants; they are considered as belonging to the same type, when they have the same basic design, present similar hazards and have similar protective measures.

4 Safety requirements and/or protective/risk reduction measures**4.1 General****4.1.1 Context**

Trucks shall comply with the safety requirements and/or protective measures of this clause. Trucks shall also be designed according to the principles of EN ISO 12100:2010 for relevant but not significant hazards, which are not dealt with by this document.

4.1.2 Specific relation to EN 1459-1 and EN 1459-2

In addition, trucks shall comply with EN 1459-1:2017+A1:2020 and EN 1459-2:2015+A1:2018 as applicable, for the significant hazards not covered by this document.

EN 1459-4:2020 (E)**4.2 Stability****4.2.1 Load chart for suspended load lifting attachment(s)**

For each combination truck and lifting attachment, the load chart for suspended loads shall be provided according to the truck manufacturer's instructions for use and determined according to ISO 22915-14:2010, ISO 22915-24:2015, ISO 22915-10:2008 and ISO 22915-20:2008 and to 5.3, as applicable.

NOTE A specific part of the ISO 22915 series for suspended load applications is in development.

4.3 Connection point for lifting accessories**4.3.1 General**

The boom or carriage may be provided with a connection point intended for connecting lifting accessories (e.g. shackle and hook) to the truck.

Verification by visual inspection.

4.3.2 Maximum rated load lifting capacity

The maximum rated load lifting capacity of the truck at the connection point shall be less than or equal to 80 % of the maximum hydraulic lifting capability at that point.

The maximum rated load lifting capacity of the truck at the connection point shall not exceed the rated capacity of the truck as indicated in the load chart.

4.3.3 Strength of the connection point for lifting accessories

The connection point for lifting accessories shall be able to withstand the maximum rated load lifting capacity of the connection point. This shall be verified according to 5.4.

4.4 Dynamic structural integrity

The overall structural integrity of the truck fitted with a specified lifting attachment shall be ensured in dynamic conditions.

This shall be verified according to 5.2.

5 Verification of safety requirements and/or protective/risk reduction measures**5.1 Tests for trucks and for lifting attachments**

The following tests shall be carried out on each truck:

- a) dynamic structural test according to 5.2; and
- b) travelling / pick and carry test according to 5.3.

For trucks produced in series, where the production techniques employed and the application of a duly documented quality control system make it possible to guarantee that every truck produced will have identical characteristics when fully assembled, tests on adequate samples of the truck are considered as fulfilling the above requirement.

NOTE Static tests are specified in EN 1459-1:2017+A1:2020 and EN 1459-2:2015+A1:2018 as applicable.

5.2 Dynamic structural test

5.2.1 General

Separate tests shall be carried out on tyres and on stabilizers (if equipped).

All safety functions shall be active.

5.2.2 General test set up

Trucks shall be tested on firm level ground. The truck, fitted with a specified lifting attachment, shall be tested in the following configurations:

- a) a load of 100 % of the maximum capacity according to the load chart of the lifting attachment fitted to the truck;
- b) the load at the maximum reach according to the load chart of the lifting attachment fitted to the truck.

The jib shall be positioned to ensure the lifting connection to the lifting accessory (e.g. hook) is level with the pivot point between the carriage and boom.

If a jib is not a horizontal (straight), then level shall be as the maximum horizontal distance between the lifting connection to the lifting accessory (e.g. hook) and the pivot point between the carriage and boom (see 3.2, Figure 1).

The standard test load shall be a cube with a length of L_b , suspended by lifting accessories such as chains, ropes, slings, etc. such that the load position is as in Figure 2, where:

— $1\ 000\ \text{mm} \leq L_b \leq 1\ 300\ \text{mm}$; (standards.iteh.ai)

— $500\ \text{mm} \leq L_{acc} \leq 1\ 000\ \text{mm}$. [SIST EN 1459-4:2021
https://standards.iteh.ai/catalog/standards/sist/48fa459d-32ac-4edb-ac95-cfa4c1e152fe/sist-en-1459-4-2021](https://standards.iteh.ai/catalog/standards/sist/48fa459d-32ac-4edb-ac95-cfa4c1e152fe/sist-en-1459-4-2021)