SLOVENSKI STANDARD
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Vozila za talni transport - Terenska vozila - Varnostne zahteve in preverjanje - 1. del: Vozila z mehanizmom za dviganje s spremenljivim dosegom

Rough-terrain trucks - Safety requirements and verification - Part 1: Variable-reach trucks

Geländegängige Stapler - Sicherheitstechnische Anforderungen und Verifizierung - Teil 1: Stapler mit veränderlicher Reichweite

Chariots tout-terrain - Exigences de sécurité et vérification - Partie 1: Chariots à portée variable

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ICS:

53.060	Industrijski tovornjaki	Industrial trucks

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EUROPEAN STANDARD

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English Version

Rough-terrain trucks - Safety requirements and verification - Part 1: Variable-reach trucks

Chariots tout-terrain - Prescriptions de sécurité et vérification - Partie 1 : Chariots à portée variable

Geländegängige Stapler - Sicherheitstechnische Anforderungen und Verifizierung - Teil 1: Stapler mit veränderlicher Reichweite

This European Standard was approved by CEN on 1 May 2017.

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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

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European foreword

This document (EN 1459-1:2017) 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of an identical text or by endorsement, at the latest by March 2018 and conflicting national standards shall be withdrawn at the latest by September 2018.

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.

Together with EN ISO 3691-2:2016 and prEN 16307-2:2017, this document supersedes EN 1459:1998+A3:2012.

In comparison with the previous edition, the following significant changes have been made:

— industrial variable-reach trucks have been removed from the scope and are dealt with in EN ISO 3691-2 and EN 16307-2;

— annexes giving stability tests requirements have been removed; this standard refers to the ISO 22915 series for stability tests;

— LPG-engine powered trucks have been removed from the scope;

— performance level requirements for safety functions have been added in a table;

— ergonomic requirements have been added;

— format and requirements have been influenced by the equivalent ISO standard in order to prepare the global relevance.

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 Directives, 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 suspended loads* (in preparation)

— *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* (Technical Report)

— *Part 7: Test method and determination of noise emission* (in preparation)

— *Part 8: Variable-reach tractors* (Technical Specification)

NOTE Part 7 will be developed in line with the development of the revision of the Outdoor noise directive.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard covers general safety requirements and the means for verification of these requirements for rough-terrain variable-reach trucks.

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

Considering the technical improvements to the previous version of EN 1459, a transition period of 12 months is permitted after the date of publication, such that manufacturers can develop their products sufficiently to meet the requirements of this European Standard.

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

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.

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 European Standard specifies the safety requirements of self-propelled variable-reach rough-terrain trucks (hereafter referred to as trucks), intended to handle loads, equipped with a telescopic lifting means (pivoted boom), on which a load handling device (e.g. carriage and fork arms) is fitted.

For the purpose of this standard, rough-terrain variable-reach trucks are designed to transport, lift and place loads and can be driven on unimproved terrain.

Fork arms are considered to be part of the truck. Trucks can also be equipped with a variety of attachments (e.g. bale spikes, mowers, sweepers).

This European Standard deals with all the significant hazards, hazardous situations and events relevant to the trucks when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Annex A).

This European Standard does not apply to:

— slewing variable reach rough terrain trucks covered by EN 1459-2;

— industrial variable reach trucks covered by EN ISO 3691-2;

— lorry-mounted variable reach trucks;

— variable reach trucks fitted with tilting or elevating operator position;

— mobile cranes covered by EN 13000;

— machines designed primarily for earth moving, even if their buckets and blades are replaced with forks (see EN 474 series);

— trucks designed primarily with variable length load suspension elements (e.g. chain, ropes) from which the load may swing freely in all directions;

— trucks fitted with personnel work platforms, designed to move persons to elevated working positions;

— trucks designed primarily for container handling;

— trucks on tracks;

— trucks with articulated chassis;

— attachments (covered by prEN 1459-5).

This European Standard does not address hazards linked to:

— hybrid power systems;

— gas power system;

— gasoline engine system;

— battery power system;

— tractor specific devices (e.g. PTO).

This European Standard does not address hazards which may occur:

a) when handling suspended loads which may swing freely (additional requirements are given in prEN 1459-4 (in preparation));

b) when using trucks on public roads;

c) when operating in potentially explosive atmospheres;

d) when operating underground;

e) when towing trailers;

f) when fitted with a personnel work platform (additional requirements are given in EN 1459-3);

g) when using cruise-control.

This European Standard does not provide a method of calculation for fatigue and strength of material.

This document is not applicable to trucks manufactured before the date of its publication.

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 1175-2:1998+A1:2010, *Safety of industrial trucks - Electrical requirements - Part 2: General requirements of internal combustion engine powered trucks*

prEN 1459-5:2017, *Rough-terrain trucks - Safety requirements and verification - Part 5: Attachments and attachment interface*

EN 12053:2001+A1:2008, *Safety of industrial trucks - Test methods for measuring noise emissions*

EN 12895:2015, *Industrial trucks - Electromagnetic compatibility*

EN 13059:2002+A1:2008, *Safety of industrial trucks - Test methods for measuring vibration*

EN 13309:2010, *Construction machinery - Electromagnetic compatibility of machines with internal power supply*

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*

EN 15830:2012, *Rough-terrain variable reach trucks - Visibility - Test methods and verification*

EN 60529:1991, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*[1)]

1) This European Standard is impacted by the amendments EN 60529:1991/A1:2000 and EN 60529:1991/A2:2013.

EN 62061:2005, *Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems (IEC 62061:2005)*

EN ISO 2860:2008, *Earth-moving machinery - Minimum access dimensions (ISO 2860:1992)*

EN ISO 2867:2011, *Earth-moving machinery - Access systems (ISO 2867:2011)*

EN ISO 3449:2008, *Earth-moving machinery - Falling-object protective structures - Laboratory tests and performance requirements (ISO 3449:2005)*

EN ISO 3457:2008, *Earth-moving machinery - Guards - Definitions and requirements (ISO 3457:2003)*

EN ISO 3471:2008, *Earth-moving machinery - Roll-over protective structures - Laboratory tests and performance requirements (ISO 3471:2008)*

EN ISO 4413:2010, *Hydraulic fluid power - General rules and safety requirements for systems and their components (ISO 4413:2010)*

EN ISO 5353:1998, *Earth-moving machinery, and tractors and machinery for agriculture and forestry - Seat index point (ISO 5353:1995)*

EN ISO 6682:2008, *Earth-moving machinery - Zones of comfort and reach for controls (ISO 6682:1986, including Amd 1:1989)*

EN ISO 6683:2008, *Earth-moving machinery - Seat belts and seat belt anchorages - Performance requirements and tests (ISO 6683:2005)*

EN ISO 7096:2008, *Earth-moving machinery - Laboratory evaluation of operator seat vibration (ISO 7096:2000)*

EN ISO 11688-1:2009, *Acoustics - Recommended practice for the design of low-noise machinery and equipment - Part 1: Planning (ISO/TR 11688-1:1995)*

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

EN ISO 13849-1:2015, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2015)*

EN ISO 13850:2015, *Safety of machinery - Emergency stop function - Principles for design (ISO 13850:2015)*

EN ISO 13857:2008, *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

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

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

ISO 5053-1:2015, *Industrial trucks - Terminology and classification - Part 1: Types of industrial trucks*

ISO 6011:2003, *Earth-moving machinery - Visual display of machine operation*

ISO 6016:2008, *Earth-moving machinery - Methods of measuring the masses of whole machines, their equipment and components*

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

ISO 7000:2014, *Graphical symbols for use on equipment - Registered symbols*

ISO 9533:2010, *Earth-moving machinery - Machine-mounted audible travel alarms and forward horns - Test methods and performance criteria*

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 11112:1995+A1:2001, *Earth-moving machinery - Operator's seat - Dimensions and requirements*

ISO 12508:1994, *Earth-moving machinery - Operator station and maintenance areas - Bluntness of edges*

ISO 12509:2004, *Earth-moving machinery - Lighting, signalling and marking lights, and reflex-reflector devices*

ISO 13333:1994, *Earth-moving machinery - Dumper body support and operator's cab tilt support devices*

ISO 15817:2012, *Earth-moving machinery - Safety requirements for remote operator control systems*

ISO 15818:2017, *Earth-moving machinery - Lifting and tying-down attachment points - Performance requirements*

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

ISO 16528-1:2007, *Boilers and pressure vessels - Part 1: Performance requirements*

ISO 16528-2:2007, *Boilers and pressure vessels - Part 2: Procedures for fulfilling the requirements of ISO 16528-1*

ISO 21507:2010, *Earth-moving machinery - Performance requirements for non-metallic fuel tanks*

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 22915-14:2010, *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*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010, ISO 5053-1:2015 and the following apply.

3.1
rough-terrain variable-reach truck
variable-reach truck intended primarily for operation on unimproved natural terrain and on the disturbed terrain of, for example, construction site

[SOURCE: ISO 5053-1:2015, 2.21]

3.2
variable-reach truck
lift truck fitted with one or more articulated arms, telescopic or not, non-slewing or having a slewing movement of not more than 5° either side of the longitudinal axis of the truck used for stacking loads

[SOURCE: ISO 5053-1:2015, 2.20]

Note 1 to entry: See Figure 1.

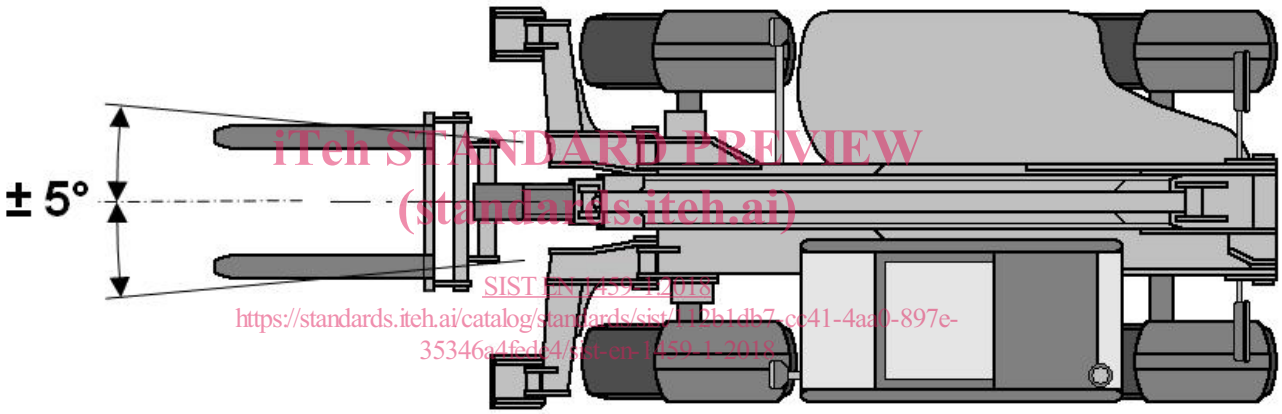


Figure 1 — Variable-reach truck

3.3
compact truck
truck having a maximum height in normal travel mode of 2 150 mm and:

— a maximum operating mass of 6 000 kg;

and/or

— a maximum width in normal travel mode of 1 850 mm

Note 1 to entry: These dimensions do not include equipment such as working lights, mirrors, etc.

3.4
actual capacity
Q
maximum load, established by the manufacturer based on components strength and truck stability, that the truck can carry, lift and stack to a specified height, at a specified standard load centre distance and reach, in normal operating conditions

Note 1 to entry: The actual capacity depends on the configuration of the truck in terms of such variables as:

— lift height;

— reach of the boom;

— standard load centre distance;

— load handling device (fork arms or attachment fitted);

— stabilizing devices.

Note 2 to entry: This actual capacity defines the load handling ability of the particular truck as equipped. Additional actual capacity ratings with removable attachments may also be established where permitted by the appropriate stability test or by calculation verified by empirical data.

3.5
rated capacity
Q1

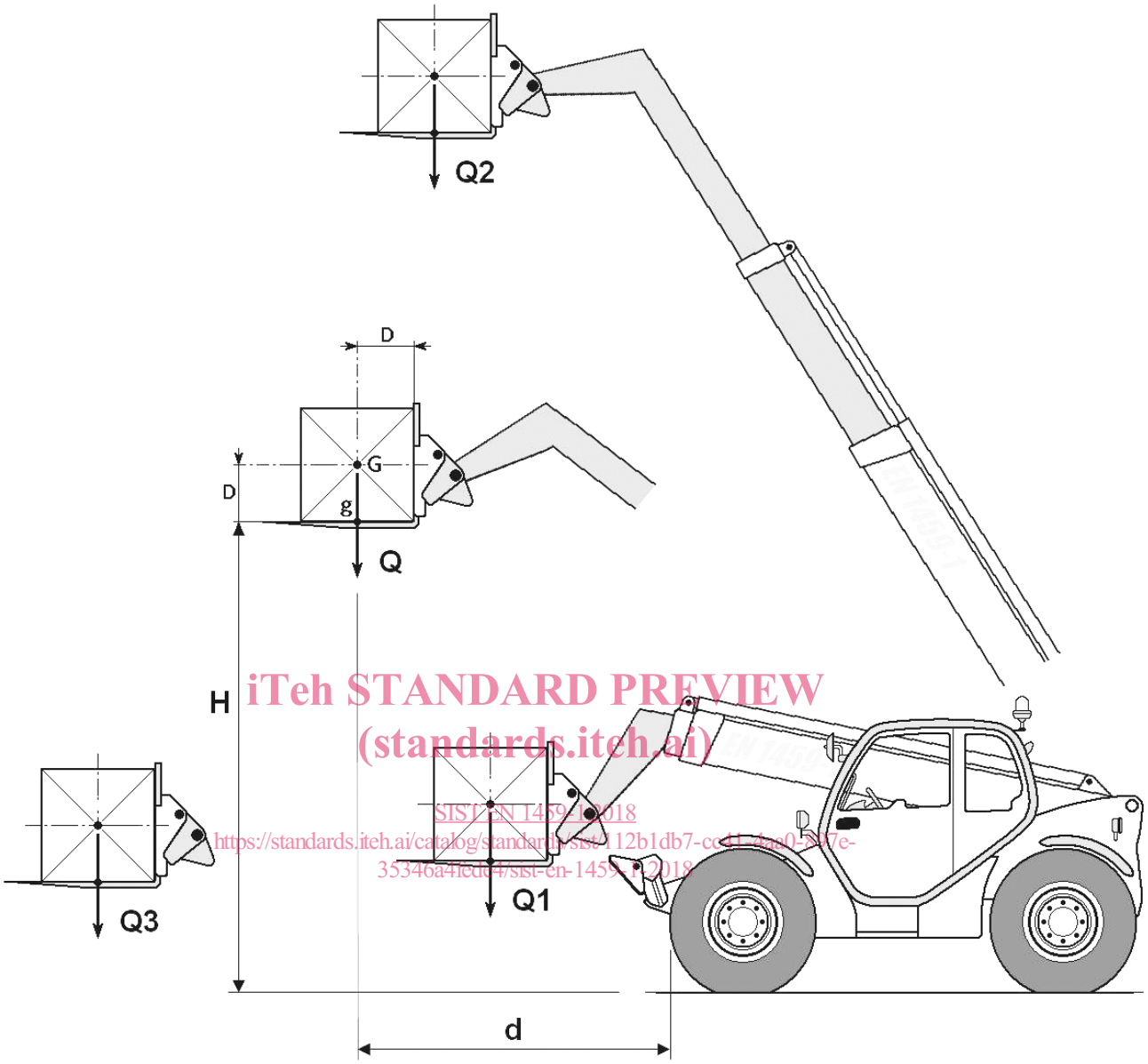
maximum load permitted by the manufacturer at the standard load centre distance (D) that the truck is capable of lifting and transporting on fork arms in normal conditions with the boom fully retracted

3.6
reach
d
distance between two vertical parallel planes, one plane tangent to the front of the outside diameter of the front tyres, the other plane described by the vertical projection of the centre-of-gravity of the load to the ground

Note 1 to entry: The centre-of-gravity of the load (G) is defined in Table 1.

Note 2 to entry: See Figure 2 for examples of reach.

Note 3 to entry: For practical matters, d can be measured referring to point g, being g the vertical projection of the centre-of-gravity (G) of the load onto the plane of the top surface of the fork arms.



Key

d reach
D standard load centre distance
G centre of gravity of the load
g the vertical projection of the centre-of-gravity (G) of the load onto the plane of the top surface of the fork arms
H height of the load
Q actual capacity
Q1 rated capacity
Q2 actual capacity at maximum height or elevation
Q3 actual capacity at maximum reach

Figure 2 — Parameters for the designation of the actual capacity of the truck with fork