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Title: Draft BS EN 17968 Rough-terrain variable-reach tractors - Safety requirements and verification for permanently mounted equipment.

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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Submission of Comments

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- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

English Version

Rough-terrain variable-reach tractors - Safety requirements and verification for permanently mounted equipment

Tracteurs tout-terrain à portée-variable - Exigences de
sécurité et vérification pour les équipements montés
en permanence

Geländegängige Traktoren mit veränderlicher
Reichweite - Sicherheitstechnische Anforderungen und
Verifizierung für permanent montierte Ausrüstung

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 150.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN 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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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (prEN 17968:2025) has been prepared by Technical Committee CEN/TC 150 “Industrial trucks - Safety”, the secretariat of which is held by BSI.

This document will supersede CEN/TS 1459-8:2018.

In comparison with the previous edition CEN/TS 1459-8:2018, the following technical modifications have been made:

- alignment to requirements of EN 1459-1:2025;
- update of normative references;
- other minor changes, mainly editorial clarifications of existing requirements.

This document has been prepared under a standardization request given to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

Introduction

This document covers general safety requirements and the means for verification of these requirements for rough-terrain variable-reach tractors (RTVR tractors).

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

This document is a type C standard as stated in EN ISO 12100:2010.

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.

Two legislative frameworks involve RTVR tractors:

- Regulation (EU) No 167/2013 providing requirements for the type-approval of agricultural and forestry vehicles, also known as Tractor Mother Regulation (TMR), which trucks are homologated according to. A number of additional Regulations supplements this one, such as:
 - Delegated Regulation (EU) No 1322/2014 with regard to construction and general requirements of agricultural and forestry vehicles;
 - Delegated Regulation (EU) 2015/208 with regard to functional safety requirements of agricultural and forestry vehicles;
 - Delegated Regulation (EU) 2015/68 with regard to braking systems of agricultural and forestry vehicles;
 - Delegated Regulation (EU) 2018/985 as regards environmental and propulsion unit performance requirements for agricultural and forestry vehicles and their engines;
 - Implementing Regulation (EU) 2015/504 with regard to the administrative requirements of agricultural and forestry vehicles.

- Directive 2006/42/EC as the permanently mounted equipment (PME), that RTVR tractors are equipped with, falls under the definition of machinery in Article 2 (a) third indent as "an assembly referred to in the first and second indents, ready to be installed and able to function as it stands only if mounted on a means of transport".

A CEN/TR "Mapping between the clauses in EN 17968 and the European frameworks involving rough-terrain variable-reach tractors" is under development.

This document is based on requirements of EN 1459-1:2025.

1 Scope

This document specifies the safety requirements relevant to load-handling functions for rough-terrain variable reach tractors (RTVR tractors). This includes the safety requirements for their permanently mounted equipment (PME).

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

This document deals with all the significant hazards, hazardous situations and events relevant to the operation of the PME of RTVR tractors 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 apply to:

- rough-terrain variable-reach trucks covered by EN 1459-1:2025;
- slewing rough-terrain variable-reach trucks covered by EN 1459-2:2015+A1:2018;
- industrial variable reach trucks covered by EN ISO 3691-2:2023;
- lorry-mounted variable-reach trucks covered by ISO 20297-1:2017;
- variable-reach trucks fitted with tilting or elevating operator position;
- mobile cranes covered by EN 13000:2010+A1:2014;
- 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 can swing freely in all directions;
- trucks designed primarily for container handling;
- trucks on tracks;
- trucks with articulated chassis;
- front loaders covered by EN 12525:2000+A2:2010;
- attachments.

Determination and declaration of sound power level is not addressed by this document.

This document does not cover sales literature.

This document does not address hazards linked to:

- operation of the RTVR tractor from a position other than the normal operating position or the remote control;
- hybrid power systems;
- gas power systems;
- gasoline engine systems;

— battery power systems.

This document does not address hazards which can occur:

- a) when handling suspended loads which can swing freely (additional requirements are given in EN 1459-4:2024+A1:2025);
- b) when using RTVR tractors on public roads;
- c) when operating in potentially explosive atmospheres (additional requirements are given in EN 1755:2024);
- d) when operating underground;
- e) when towing trailers;
- f) when fitted with a personnel work platform (additional requirements are given in EN 1459-3:2015 and EN 1459-9:2021);
- g) when using system capable of controlling the speed of the RTVR tractor as set by the operator (cruise-control).

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

This document is not applicable to RTVR tractors 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 1459-5:2020,¹ *Rough-terrain trucks — Safety requirements and verification — Part 5: Attachment interface*

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

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

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

EN 17314:2020, *Industrial trucks — Specifications and test methods — Operator restraint systems other than lap-type seat belts*

EN 60529:1991,² *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN IEC 62061:2021, *Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems (IEC 62061:2021)*

¹ This document is impacted by EN 1459-5:2020/prA1:202x.

² This document is impacted by the amendments EN 60529:1991/A1:2000 and EN 60529:1991/A2:2013.

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

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 13849-1:2023, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2023)*

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

EN ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2019)*

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 3864-1:2011, *Graphical symbols — Safety colours and safety sign — Part 1: Design principles for safety signs and safety markings*

ISO 3864-2:2016, *Graphical symbols — Safety colours and safety sign — Part 2: Design principles for product safety labels*

ISO 3864-3:2024, *Graphical symbols — Safety colours and safety sign — Part 3: Design principles for graphical symbols for use in safety signs*

ISO 3864-4:2011, *Graphical symbols — Safety colours and safety sign — Part 4: Colorimetric and photometric properties of safety sign materials*

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

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

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

ISO 9244:2008³, *Graphical symbols for use on equipment — Registered symbols*

ISO 10263-2:2009, *Earth-moving machinery — Operator enclosure environment — Part 2: Air filter element 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 12509:2023, *Earth-moving machinery and rough-terrain trucks — Lighting, signalling and marking lights, and reflex reflectors*

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 22915-10:2023, *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 22915-20:2023, *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 5053-1:2020 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 tractor

motorised, wheeled agricultural or forestry vehicle having two axles and a maximum design speed of not less than 6 km/h, the main function of which lies in its tractive power and which has been especially

³ As impacted by ISO 9244:2008/Amd 1:2016.

designed to pull, push, carry and actuate certain interchangeable equipment designed to perform agricultural or forestry work, or to tow agricultural or forestry trailers or equipment

[SOURCE: Regulation (EU) No 167/2013, Article 3(8), modified]

3.2

rough-terrain variable-reach tractor

RTVR tractor

tractor having one telescopic articulated arm, non-slewing or having a slewing movement of not more than 5° either side of the longitudinal axis of the RTVR tractor used for stacking loads

Note 1 to entry: See Figure 1.

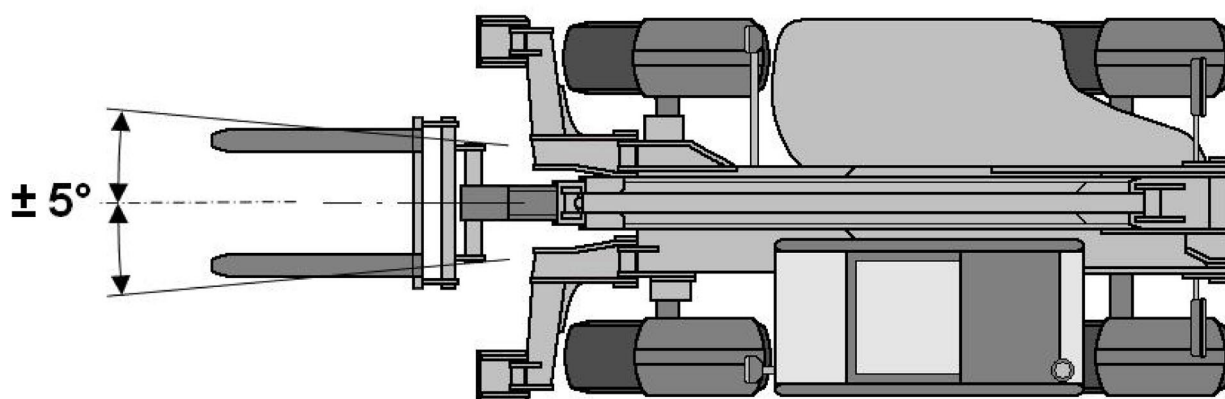


Figure 1 — RTVR tractor

3.3

compact rough-terrain variable-reach tractor

RTVR tractor having a maximum height in normal travel mode of 2 150 mm and at least one of the following conditions:

- a maximum operating mass of 7 000 kg;
- a maximum width in normal travel mode of 2 000 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 RTVR tractor stability, that the RTVR tractor 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 RTVR tractor 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 RTVR tractor 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 RTVR tractor is capable of lifting and transporting on fork arms in normal conditions with the boom fully retracted

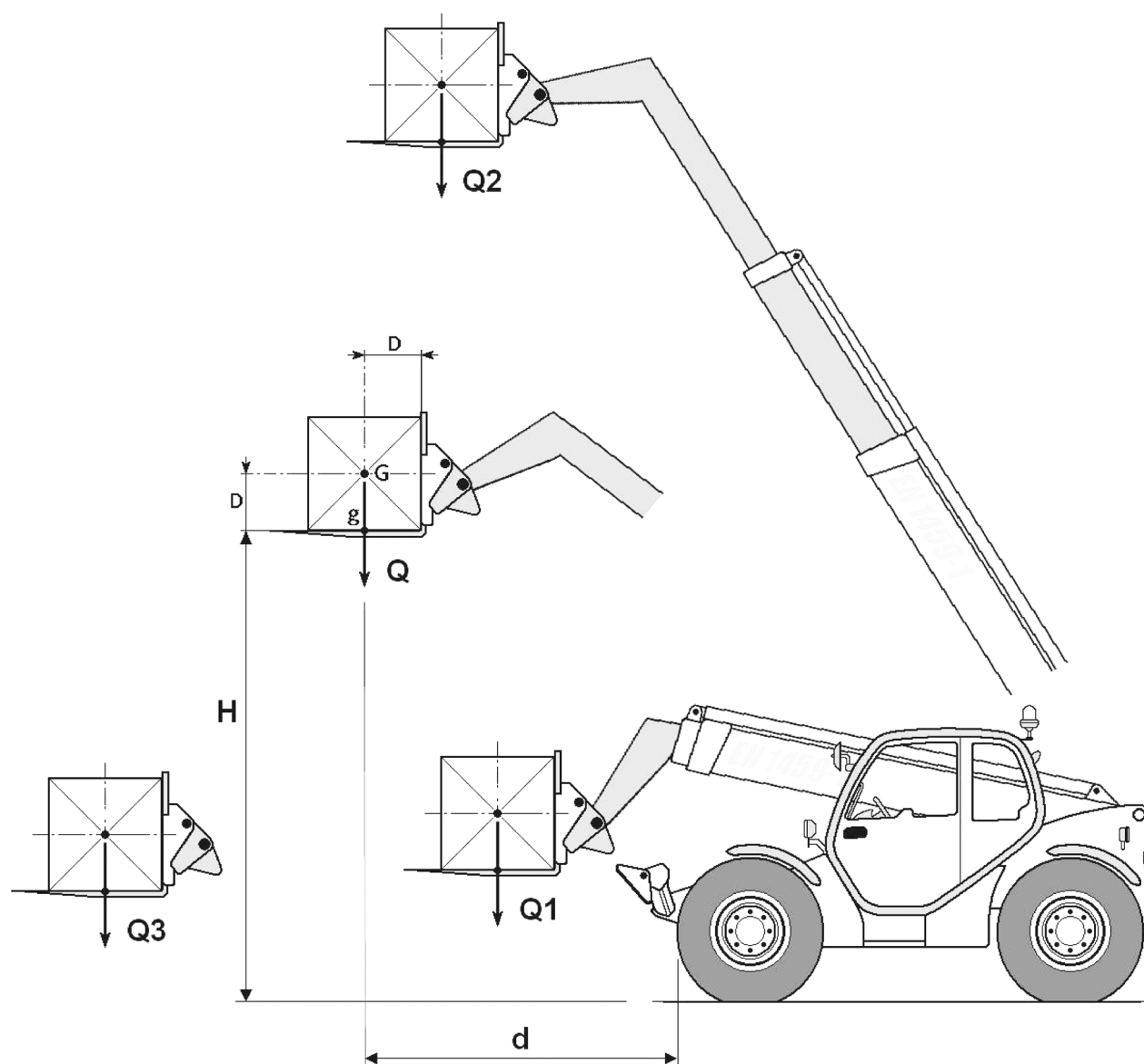
3.6 reach d

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 RTVR tractor with fork

3.7 lift height H

vertical distance between the upper face of the fork arms and the ground

Note to entry: See Figure 2.

3.8 standard load centre distance D

distance from the centre of gravity (*G*) of the load measured horizontally back to the front of the fork shanks and vertically down to the upper faces of the fork arms, as specified in Table 1

Note 1 to entry: See Figure 2, for example.

Note 2 to entry: Typical standard load centre distances are given in Table 1. Trucks may be rated for special applications with load centres related to those applications which may be different from those listed in Table 1.

Table 1 — Typical standard load centre distance

Rated capacity Q in kg		Standard load centre distance D in mm				
		400	500	600	900	1 200
0	< 1 000	X				
≥ 1 000	< 5 000		X			
≥ 5 000	≤ 10 000			X		
> 10 000	< 20 000			X	X	X
≥ 20 000	< 25 000				X	X
≥ 25 000						X

3.9 axle oscillation lock

mechanism designed to prevent oscillation of an axle to improve RTVR tractor stability

3.10 stabilising devices

extendable and/or pivoting mechanical supports used to improve stability of a RTVR tractor when stationary

3.11 lateral levelling

changing the lateral inclination angle between the chassis and the ground to ensure the boom operates in a vertical plane even when the RTVR tractor is positioned on a side slope

3.12 forks

device comprising two or more solid fork arms, each consisting of a shank (vertical portion) and blade, which is hook- or shaft-mounted, fitted on the carriage and usually adjusted manually

3.13 boom

pivoting support member that permits horizontal and vertical positioning of the load or attachment

3.14

crab steering mode

steering mode where all wheels of the RTVR tractor steer in the same direction

3.15

normal operating position

position specified by the manufacturer in which the operator is able to control the RTVR tractor operations, including load handling functions

3.16

attachment bracket

device fitted at the end of the boom to mount interchangeable attachments to facilitate quick interchange of attachment

3.17

boom float

operating mode that uses gravity to allow an attachment at the end of the boom to follow a contour (e.g. the ground)

3.18

maximum working pressure

maximum pressure in the hydraulic circuit during normal operation

Note to entry: This definition is derived from ISO 10972-3:2003, 3.2.

3.19

level ground

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

3.20

operating mass

mass of the RTVR tractor equipped with forks, unladen, and with the operator (75 kg), full fuel tank and all fluid systems (i.e. hydraulic oil, transmission oil, engine oil, engine coolant) at the levels specified by the manufacturer

3.21

technically permissible maximum operating mass

operating mass without the forks and including the heaviest permitted attachment without load

3.22

operator's station

part of the machine which surrounds the normal operating position

3.23

enclosed cab

cab where door(s) or windows are fitted to all openings

3.24

open cab

cab which is not an enclosed cab

3.25**permanently mounted equipment****PME**

part of the RTVR tractor intended for loads handling, which includes one or more telescopic articulated arms, not intended to be removed during normal use, on which a load handling device (e.g. carriage and fork arms) is fitted

Note to entry: The PME includes all “aspects” of the RTVR tractor not covered by Regulation (EU) No 167/2013. These can correspond to physical parts in full, e.g. boom and load controls, LLMC and LLMI, stabilizers, or partially, e.g. cab protective structures.

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

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

4.1.2 Sharp edges and acute angles

A CEN/TR “Mapping between the clauses in EN 17968 and the European frameworks involving rough-terrain variable-reach tractors” is under development.

4.1.3 Stored energy components

Components that store energy and can cause a risk of injury during removal or disassembly, e.g. hydraulic accumulators and spring-applied brakes, shall be provided with a means to release the energy before removal or disassembly and shall be marked according to 6.2.8.

Verification by test and visual examination.

4.2 Starting/stopping of engine and moving machine**4.2.1 Unauthorized starting**

A CEN/TR “Mapping between the clauses in EN 17968 and the European frameworks involving rough-terrain variable-reach tractors” is under development.

4.2.2 Stopping system

A CEN/TR “Mapping between the clauses in EN 17968 and the European frameworks involving rough-terrain variable-reach tractors” is under development.

4.2.3 Unintended movement

RTVR tractors shall be fitted with a device that prevents the engine being started while the drive-system is engaged. When the drive system direction control is in neutral, provisions shall be made to locate and maintain it in its neutral position. This device shall comply with Table 2.

NOTE CEN/TR 1459-6:2015 describes the methodology followed to determine the values of PLr listed in Table 2.

Verification by functional test.

4.2.4 Uncontrolled motion

Means shall be provided to prevent the RTVR tractor from moving from rest on level ground until the drive system has been engaged. These means shall comply with Table 2.

Verification by functional test.

4.2.5 Powered travel movement

Means shall be provided to prevent powered travel when the operator is not at the normal operator's position. Powered travel shall not occur automatically when the operator returns to the normal operator's position without an additional operation, e.g. by requiring resetting the direction control.

Application of the parking brake shall engage transmission in neutral, except on RTVR tractors with hydro-static transmission.

The release of parking brake shall not engage the transmission automatically.

NOTE On RTVR tractors with hydro-static transmission, the transmission system achieves the same objective.

Verification by functional test.

Means to fulfil these requirements shall comply with Table 2.

4.2.6 Non-activation of the parking brake

Park brake operator presence control (OPC) shall comply with Table 2.

Verification by functional test.

4.3 Brakes

4.3.1 General

A CEN/TR "Mapping between the clauses in EN 17968 and the European frameworks involving rough-terrain variable-reach tractors" is under development.

Where electromechanical parking brake system is fitted, the braking device shall be applied mechanically and released electrically.

Verification by design-check.

Where hydro-mechanical parking brake is fitted, the braking device shall be applied mechanically and released hydraulically. When the operator manually releases the parking brake from the normal operating position, it shall not disable the service brakes.

Verification by design-check.

4.3.2 Failure of energy supply

A CEN/TR "Mapping between the clauses in EN 17968 and the European frameworks involving rough-terrain variable-reach tractors" is under development.

4.3.3 Holding performance

The service brake shall be capable of holding the laden RTVR tractor motionless on the maximum slope permitted by the manufacturer.

Verification by design test.