



BSI Standards Publication

Rough-terrain trucks — Safety requirements and verification

Part 9: Variable-reach trucks equipped with work platforms having a front guard that can be opened

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European foreword

This document (EN 1459-9:2021) 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of an identical text or by endorsement, at the latest by September 2021, and conflicting national standards shall be withdrawn at the latest by September 2021.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.

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: Attachment interface;*
- *Part 6: Application of EN ISO 13849-1 to slewing and non-slewing variable-reach rough-terrain trucks (Technical Report);*
- *Part 8: Variable-reach tractors (Technical Specification);*
- *Part 9: Variable-reach trucks equipped with work platforms having a front guard that can be opened.*

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Introduction

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

All quantities are in metric units.

For work platforms with front guards that can be opened, restraint devices (harness and lanyard) are used as personal protective equipment (PPE) and are intended to be the protection against the risk of falling; to reach this objective, requirements related to the length of the harness have been specified. Also, protective measures are consequently provided in this document assuming that not connecting harness to lanyard or lanyard to anchorage on the work platform is a foreseeable misuse, therefore requirements related to monitoring the harnesses have been specified. It is also assumed that not wearing harness is a foreseeable misuse, and warnings and information for use are required accordingly.

Work platforms having a front guard that can be opened at height are not intended for general work activities and should only be used where they can be demonstrated to be the safest work method possible for an activity.

EN 1459-9 covers platforms for roof material removal. It does not cover other platforms for other roofs activities, which can have different technical solutions to cover the risk of falling.

1 Scope

This document specifies the safety requirements for slewing rough-terrain variable-reach trucks and rough-terrain variable-reach trucks defined by ISO 5053-1 (hereafter referred to as trucks) and their work platforms having front guards that can be opened for removal of roof material (hereafter referred to as work platforms).

This document deals with the significant hazards, hazardous situations and events relevant to the combination of the truck and the integrated work platform when it is used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer. The significant hazards covered by this document are listed in Annex A.

NOTE 1 Duplicate controls for the slewing upper structure, the boom and the work platform movements can be also provided under specific circumstances at the operating position in the enclosed cab of the truck.

This document does not address hazards which can occur:

- a) when using non-integrated work platforms or other attachments not designed for lifting persons;
- b) when handling suspended work platforms which can swing freely;
- c) when operating underground or in potentially explosive atmospheres;
- d) when removing asbestos, regarding the possible release of fibres.

This document does not specify safety requirements for trucks equipped with work platforms intended for leaving and re-entering at height.

NOTE 2 National regulations for worksites can apply for asbestos removal to cover the risks related to the possible release of fibres.

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 280:2013+A1:2015, *Mobile elevating work platforms — Design calculations — Stability criteria — Construction — Safety — Examinations and tests*

EN 1459-3:2015, *Rough-terrain trucks — Safety requirements and verification — Part 3: Interface between the variable-reach truck and the work platform*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 280:2013+A1:2015, EN 1459-3:2015 and 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

work platform

integrated interchangeable platform, i.e. one with controls, which can be moved under load to the required working position and where guard-rail(s) can be opened on the front side to facilitate particular operations at height (e.g. retrieving bulky loads like asbestos roof panels)

3.2

front side

side of the work platform opposite to the rear side

3.3

rear side

side of the work platform where means to mechanically assemble the truck and the work platform are positioned

3.4

access position

position(s) of the work platform on the ground to provide access for persons to and from the work platform

3.5

safety operator position

position on the rear side of the work platform where every permitted persons is monitored and where the rear side of the platform is the most distant from the front side

4 Safety requirements

4.1 General

The combination of the truck and the interchangeable work platform shall comply with EN 1459-3, EN 280:2013+A1:2015, as modified below, and the following requirements.

Work platforms shall comply with EN 280:2013+A1:2015, 5.6.3, and 5.6.2 on all sides except that front guards may be opened by the persons on the work platform. Effort on the control lever or to move the front guard-rail for manual opening shall be limited to 200 N per person. Means shall be provided to prevent uncontrolled movement of the guards during opening and closure.

When the front guards are closed, the work platform in its entirety shall comply with EN 280:2013+A1:2015, 5.6.2.

When the front guards are opened, this shall include the associated toe guards.

The floor of the work platform shall be flat and clear from permanent obstacles to prevent trip of persons.

4.2 Movements of the truck and the boom

Movements of the truck and the boom shall only be possible when:

- a) the front guard(s) is(are) fastened in the closed position given in EN 280:2013+A1:2015, 5.6.2; or
- b) all persons permitted on the work platform are in the safety operator position.

Front guard(s) shall be interlocked and the safety operator position shall be monitored by means of a safety device complying with requirements given in 5.11 of EN 280:2013+A1:2015 for 5.6.3.

4.3 Restraint devices

4.3.1 Personal protective equipment

The work platform shall be provided with a restraint device to maintain each permitted person within the work platform and prevent them from leaning over the edge.

NOTE EN 360, EN 361 and EN 363 provide requirements for lanyard and harness.

4.3.2 Connection of harnesses and lanyards

Means shall be provided to prevent movements of the truck and the boom if any of the harnesses or lanyards are not connected to the anchorages provided on the work platform according to EN 280:2013+A1:2015, 5.6.14.

An audible and visual warning shall be provided on the truck and the work platform when any of the lanyards or harnesses are not connected when in MEWP function mode given in EN 1459-3:2015, 4.1.

There shall be no provisions for the operator to cancel a warning.

4.3.3 Fix harnesses and lanyards

Subclause 4.3.2 is not required if harness and lanyard cannot be disconnected without tools between each other and from the anchorages provided on the work platform.

In this case a safety sign according to 6.2.1 shall be provided at the control position on the work platform each time the MEWP function mode given in EN 1459-3:2015, 4.1 is activated.

4.4 Duplicate controls

The controls at the operating position in the cab of the truck and the platform controls shall be interlocked so it is possible to operate from only one control position at the same time.

It shall only be possible to operate the truck and the boom movements from the cab when a hold-to-run control device is actuated as enabling device from the control position in the work platform. This device shall be designed to prevent unintended actuation and sustained involuntary operation, and in a way that defeat is hindered.

This mode of operation shall be set using a safety device situated in the work platform complying with the requirements given in 5.11 of EN 280:2013+A1:2015 for 5.7.4 and shall not disable the MEWP function mode given in EN 1459-3:2015, 4.1.

If the platform is designed to be used also with less than the maximum number of persons allowed, means shall be provided on the platform to select the number of persons in the work platform. The selection shall be possible only when the platform is at the access position. If no selection is made, the platform shall not move from the access position.

5 Verification

5.1 General

Verification shall be carried out on each type of truck and work platform combination.

6 Information for use

6.1 General

The instruction handbook shall include the following additional information:

- a) Prohibition of leaving and entering the work platform where guard-rails are opened or absent if the platform is not at the access position;
- b) Information on all characteristics of the restraint devices including their maximum permitted length and their approved replacements;
- c) Information that safety instructions must be followed by all persons on the platform;
- d) The following statement: “Work platforms having a front guard that can be opened at height are not suitable for general work activities. They should only be used where they are the safest work method for that activity”.

6.2 Marking

6.2.1 General

The following symbol (ISO 7010 no. M 018) in Figure 1 shall be used to signify that safety harness and lanyard shall be used by each person permitted on the work platform.



Figure 1 — Safety harness and lanyard

6.2.2 Residual risks

A safety sign shall be provided according to ISO 15870 prohibiting entering/leaving the work platform with the front-guard(s) opened when at height.

Where residual risks exist despite inherent safe design measures, they shall be legibly and indelibly (e.g. weather proof, profiled letters) marked in accordance with ISO 15870.

Annex A
(informative)

List of significant hazards

This Annex contains all the significant hazards, hazardous situations and events identified by risk assessment as significant for interchangeable equipment and which require action to eliminate or reduce the risk. See Table A.1.

Table A.1 — Correspondence of significant hazards

Group	Significant hazard in accordance with EN ISO 12100:2010, Table B.1	Clause(s)/subclause(s) of this EN
General, for many machines relevant		
1		
Mechanical hazards		
1.1	Due to machine parts or workpieces, e.g. — by potential energy (falling objects, height from the ground, gravity)	
	— by kinetic energy (acceleration, deceleration, moving/rotating elements)	
	— by mechanical strength (break-up)	
1.2	by stored energy, e.g.: — elastic elements (springs)	
1.3	Crushing	4.1
1.4	Shearing	
1.5	Cutting or severing	
1.6	Entanglement	
1.7	Drawing-in or trapping	
1.8	Impact	
1.9	Stabbing or puncture	
1.10	Friction or abrasion	
1.11	Injection	
1.12	Slipping, tripping and falling	4.1
1.13	Instability	

Group	Significant hazard in accordance with EN ISO 12100:2010, Table B.1	Clause(s)/subclause(s) of this EN
2 Electrical hazards		
2.1	Touching live parts	
2.2	Parts which have become live under fault conditions	
2.3	Not enough distance to live parts under high voltage	
2.4	Electrostatic phenomena	
2.5	Electromagnetic phenomena	
2.6	Projection of molten particles	
2.7	Short-circuit	
2.8	Overload	
2.9	Thermal radiation	
3 Thermal hazards		
3.1	Burn, scald	
3.2	Frostbite	
3.3	Radiation of heat sources	
3.4	Dehydration	
4 Noise hazards		
4.1	Permanent hearing loss, tinnitus	
4.2	As a consequence of an interference with speech communication or with acoustic signals	
4.3	Physiological impairment (e.g. loss of balance, loss of awareness)	
5 Vibration hazards		
5.1	Vibrations transmitted to the operator when sitting during operation	
5.2	Portable hand-held and/or hand-guided machinery (e.g. vascular disorder, neurological disorder)	
5.3	In conjunction with a rigid position (e.g. trauma of the spine, osteo-articular disorder, low-back morbidity)	

Group	Significant hazard in accordance with EN ISO 12100:2010, Table B.1	Clause(s)/subclause(s) of this EN
6	Radiation hazards	
6.1	Low frequency electromagnetic radiation	
6.2	Radio frequency electromagnetic radiation	
6.3	Optical radiation (infrared, visible and ultraviolet)	
6.4	Laser	
6.5	Ionizing radiation source	
7	Material/ substance hazards	
7.1	Hazards from contact with inhalation of harmful fluids, gases, mists, fumes and dusts	
7.2	Fire	
7.3	Explosion	
7.4	Biological and microbiological (viral or bacterial) agent	
7.5	Use/application of pesticides	
8	Ergonomic hazards	
8.1	Unhealthy postures or excessive effort	4.1
8.2	Inadequate consideration of anatomy	
8.3	Insufficient means for evacuation/emergency exit	
8.4	Inadequate local lighting	
8.5	Design or location of indicators and visual displays units	
8.6	Design, location or identification of control devices	
8.7	Flicker, dazzling, shadow, stroboscopic effect	
8.8	Mental overload/underload	
8.9	Human error during operation	4.3
8.10	Repetitive activity	
9	Hazards associated with the environment in which the machine is used	
9.1	Lightning	
9.2	Moisture	
9.3	Pollution	
9.4	Snow, water, wind, temperature	
9.5	Exhaust gas/ lack of oxygen at workplace	

Group	Significant hazard in accordance with EN ISO 12100:2010, Table B.1	Clause(s)/subclause(s) of this EN
9.6	Dust and fog	
10		
10.1	Failure/disorder of the control system and control circuits	4.2 4.4
10.2	Restoration of energy supply after an interruption	
10.3	Software error	
10.4	Failure of the power supply	
11 Combination of hazards		
11.1	— for example, repetitive activity + effort + high environmental temperature	
11.2	— for example, dismantling of heavy guards + painful effort	
12 Hazards due to: — assembly and installation — setting — cleaning — fault-finding — maintenance		
12.1	Maintenance	6.1
12.2	Insufficient means of access during use, setting and maintenance	
12.3	Cleaning inside the machine	
12.4	Being trapped in a machine	
Supplementary, for certain categories of machinery		
13 Hazards due to contamination of: foodstuffs, cosmetics or pharmaceutical products		
13.1	Unsuitable material	
14 Hazards due to portable machinery — hand-held and/or hand-guided machinery		
14.1	Instability	
14.2	Accidental starting/or continued operation	
14.3	Accidental start	

Group	Significant hazard in accordance with EN ISO 12100:2010, Table B.1	Clause(s)/subclause(s) of this EN
15	Hazards due to working with wood and material with similar physical characters	
15.1	Ejection of workpieces	
	Supplementary, due to the mobility of machinery	
16	Hazards related to travelling function	
16.1	Movement when starting the engine	
16.2	Movement without a driver at the driving position	
16.3	Movement without all parts in safe position	
16.4	Excessive speed of pedestrian controlled machinery	
16.5	Insufficient ability of machinery to be slowed down, stopped and immobilized	
17	Hazards linked to work position (including driving station) on the machine	
17.1	Fall of persons during access to or at/from the work position	
17.2	Fire (lack of extinguishing means)	
17.3	Mechanical hazards at the work position, such as: — contact with the wheels — rollover and overturning — slipping during access — fall of objects, penetration by objects — contact of persons with machine parts or tools (pedestrian controlled machines)	
17.4	Insufficient visibility from the work position	4.4
17.5	Inadequate seating	
18	Hazards due to the control system	
18.1	Inadequate location of manual controls	
18.2	Inadequate design of manual controls and their mode of operation	4.4
19	Hazards due to the power source and the transmission of power	
19.1	Engine and batteries	
19.2	Transmission of power between machines	

Group	Significant hazard in accordance with EN ISO 12100:2010, Table B.1	Clause(s)/subclause(s) of this EN
19.3	Couplings and towings	
20 Hazards from/to third persons		
20.1	Unauthorized start-up/use	
20.2	Drift of a part away from its stopping position	
20.3	Lack or inadequacy of visual or acoustic warning means	
21 Hazards due to insufficient instruction for the driver/operator		
21.1	Insufficient instruction for the driver/operator	6
Supplementary, due to lifting operations		
22 Mechanical hazards caused by load falls, collisions, machine tipping		
22.1	Lack of stability	
22.2	Uncontrolled loading, overloading, overturning moments exceeded	
22.3	Uncontrolled amplitude of movements	
22.4	Unexpected/unintended movement of loads	
22.5	Inadequate holding devices/accessories	
22.6	Collision of more than one machine	
22.7	Access of persons to load support	
22.8	Derailment	
22.9	Insufficient mechanical strength of parts	
22.10	Inadequate design of pulleys and drums	
22.11	Inadequate selection of chains, ropes, lifting and accessories and their inadequate integration into the machine	
22.12	Lowering of the load under the control of friction brake	
22.13	Abnormal conditions of assembly/use/maintenance	
22.14	Effect of load on persons (impact by load or counterweight)	
23 Hazards linked to driver/operator position		
23.1	Insufficient visibility from driver position	
Supplementary, for machinery intended for underground work		

Group	Significant hazard in accordance with EN ISO 12100:2010, Table B.1	Clause(s)/subclause(s) of this EN
24 Mechanical hazards		
24.1	Lack of stability of powered roof supports	
24.2	Failing accelerator or brake control of machinery running on rails	
24.3	Failing or lack of deadman's control of machinery running on rails	
25 Ergonomic hazards		
25.1	Restricted movements of persons	
26 Hazards associated with the environment in which the machine is used		
26.1	Fire and explosion	
26.2	Emission of dust, gases, etc.	
Supplementary, for machinery presenting particular hazards due to the lifting of persons		
27 Mechanical hazards		
27.1	Due to: — inadequate mechanical strength — inadequate working coefficients — failing of loading control	4.2
27.2	Failing of controls in person carrier (function, priority)	4.4
27.3	Overspeed of person carrier	
27.4	Falling of persons from person carrier	4.2 4.3
Hazards not be by eliminated or reduced by inherently safe design measures or safeguarding and/or complementary protective measures		
—	—	

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