
**Industrial trucks — Verification of
stability —**

**Part 11:
Industrial variable-reach trucks**

Chariots de manutention — Vérification de la stabilité —

Partie 11: Chariots de manutention à portée variable

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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.

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 22915-11 was prepared by Technical Committee ISO/TC 110, *Industrial trucks*, Subcommittee SC 2, *Safety of powered industrial trucks*.

This first edition of ISO 22915-11 cancels and replaces ISO 13562-1:2000, of which it constitutes a technical revision.

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ISO 22915 consists of the following parts, under the general title *Industrial trucks — Verification of stability*:

- *Part 1: General* <https://standards.iteh.ai/catalog/standards/sist/316b2286-4a55-4981-a9e4-fa85f579353c/iso-22915-11-2011>
- *Part 2: Counterbalanced trucks with mast*
- *Part 3: Reach and straddle trucks*
- *Part 4: Pallet stackers, double stackers and order-picking trucks with operator position elevating up to and including 1 200 mm lift height*
- *Part 7: Bidirectional and multidirectional trucks*
- *Part 8: Additional stability test for trucks operating in the special condition of stacking with mast tilted forward and load elevated*
- *Part 10: Additional stability test for trucks operating in the special condition of stacking with load laterally displaced by powered devices*
- *Part 11: Industrial variable-reach trucks*
- *Part 13: Rough-terrain trucks with mast*
- *Part 14: Rough-terrain variable-reach trucks*
- *Part 20: Additional stability test for trucks operating in the special condition of offset load, offset by utilization*
- *Part 21: Order-picking trucks with operator position elevating above 1 200 mm*

Single side-loading trucks, pedestrian-propelled trucks, and lateral- and front-stacking trucks with elevating operator position are to form the subject of future Parts 5, 16 and 22.

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Industrial trucks — Verification of stability —

Part 11: Industrial variable-reach trucks

1 Scope

This part of ISO 22915 specifies tests for verifying the stability of industrial variable-reach trucks, equipped either with fork arms or with load-handling attachments.

It is not applicable to those trucks designed for handling freight containers; nor is it applicable to rough-terrain variable-reach trucks, which are covered by ISO 22915-14.

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 3691-2, *Industrial trucks — Safety requirements and verification — Part 2: Self-propelled variable-reach trucks*

ISO 5053, *Powered industrial trucks — Terminology*

ISO 22915-1, *Industrial trucks — Verification of stability — Part 1: General*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 3691-2 and ISO 22915-1 and the following apply.

3.1

variable-reach truck

counterbalanced lift truck with an articulating boom, telescopic or not, non-slewing as defined in ISO 5053 or having a slewing movement of not more than 5° on either side of the truck's longitudinal axis, used for stacking loads

NOTE 1 The load-handling means may be mounted directly on the lifting means or on an auxiliary mast fixed at the end of the lifting means.

NOTE 2 Variable-reach trucks may be fitted with a rigid or articulating chassis, stabilizers, axle-locking or lateral frame levelling devices as defined in ISO 3691-2, or two- or four-wheel steering or articulating chassis steering systems.

3.2

industrial variable-reach truck

variable-reach truck designed for operation on substantially firm, smooth, level, prepared and consolidated surfaces

4 Test conditions

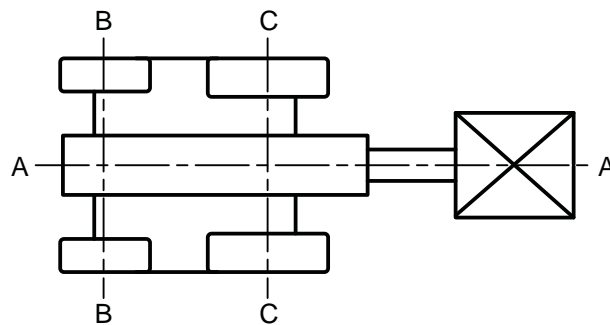
4.1 General

See ISO 22915-1.

4.2 Position of truck on the tilt table

4.2.1 Load and steer axles

The load/drive axle and the steer axle are defined by Figure 1.



Key

- A-A longitudinal centre plane of truck
- B-B steer axle (rear axle)
- C-C load/drive axle

NOTE The load/drive axle may also be a steer axle on four-wheel steer trucks.

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Figure 1 — Load and steer axles

4.2.2 Tests 1 and 2

The truck shall be positioned on the tilt table so that its load axle, C-C, and steer axle, B-B, are parallel to the tilt axis, X-Y, of the tilt table. See Table 1.

4.2.3 Tests 3, 4 and 5

The truck shall be positioned on the tilt table in a turning position with the line, M-N, parallel to the tilt axis, X-Y, of the tilt table. See Table 1.

For trucks with an articulating steer axle, the wheel on the steer axle nearest to the tilt axis, X-Y, shall be parallel to X-Y. See Table 1.

Point M is defined as follows:

- a) For trucks with an articulating steer axle: point M shall be the projection onto the tilt table of the intersection of the longitudinal centre plane, A-A, of the truck with the axis of the steer axle (see Table 1).
- b) For trucks with an articulating chassis: point M shall be the projection onto the tilt table of the intersection of the longitudinal centre plane, J-J, of the rear chassis module and the axis of the rear axle (see Table 1) when fully articulated.

- c) For trucks with axle locking: point M shall be the centre point of the area of contact between the tilt table and the rear wheel nearest to the tilt axis, X–Y, of the tilt table (see Table 1).

As shown in Table 1, point N is defined as the centre point of the area of contact between the tilt table surface and the load wheel (or stabilizer pad, if fitted) closest to the tilt axis, X–Y, of the tilt table.

4.3 Test load

Tests 1 and 3 shall be conducted with the test load in the least stable combination of lift and reach, with the fork arms in the horizontal position.

Test 5 shall be conducted at maximum and minimum boom extensions, at the maximum boom angle and with the fork arms in the horizontal position.

See Table 1.

4.4 Lift height

For tests simulating travel, i.e. Tests 2 and 4, the upper face of the fork arms, measured at the heel of the fork arm when fully tilted rearward, shall be positioned

- 300 mm above the tilt table for trucks of 10 t rated capacity or less, and
- 500 mm for trucks of greater than 10 t rated capacity.

See Table 1.

4.5 Lateral test procedure

For trucks fitted with selectable stabilizers and/or axle locking, Tests 1 and 3 shall be conducted both with stabilizers/axle locking engaged and disengaged.

See Table 1.

5 Verification of stability

The stability of a truck shall be verified in accordance with Table 1.

6 Marking

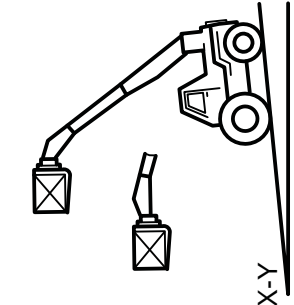
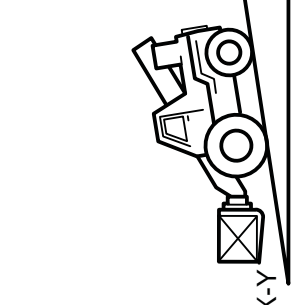
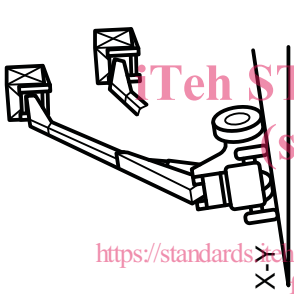
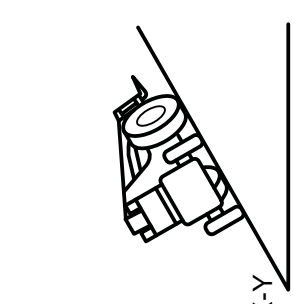
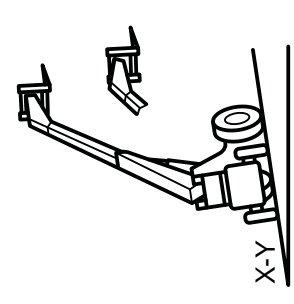
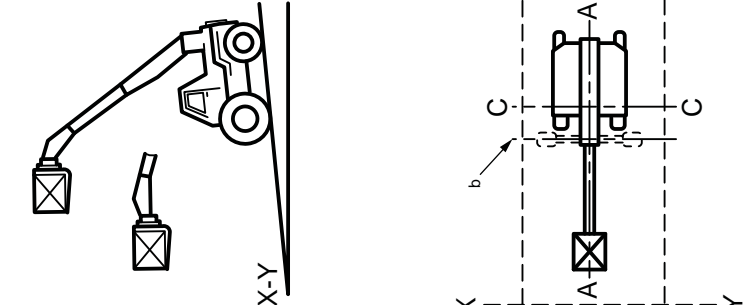
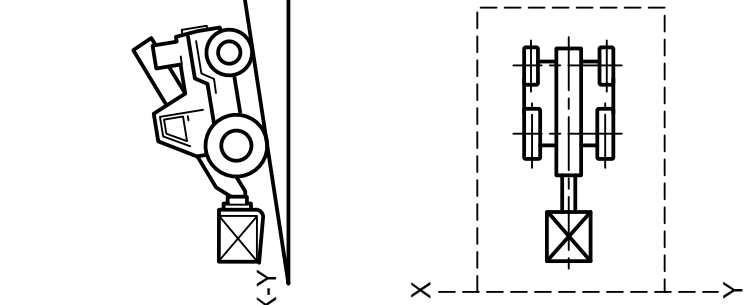
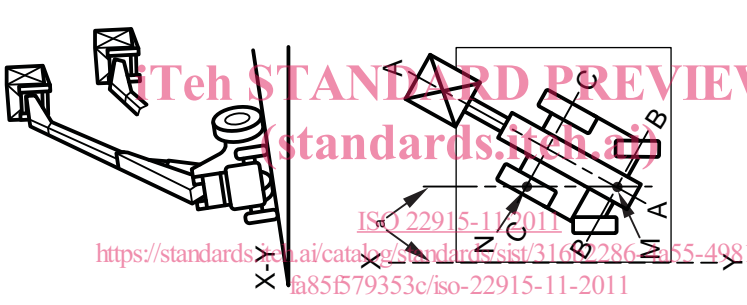
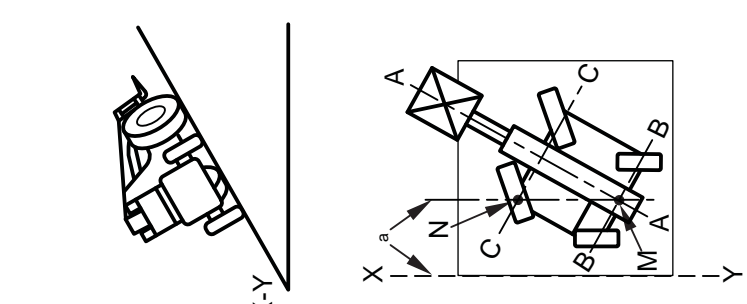
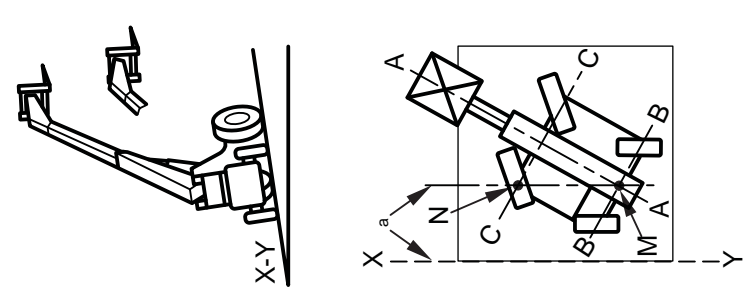
The capacity under the operating condition, with stabilizers and/or axle locking engaged and disengaged, as determined by this stability test, shall be indicated on an information plate in view of the operator in the normal operating position according to ISO 3691-2.

Table 1 — Verification of stability

Test criteria		Test 1	Test 2	Test 3	Test 4	Test 5
Direction of test	Longitudinal	x	x			
	Lateral			x	x	x
Direction of load-handling device	Load leading	x	x			
	Load trailing					
Mode of operation	Travelling		x		x	
	Stacking/retrieving	x		x		x
	With	x	x	x		
Load at load centre	Without				x	x
Lift/reach position	Max. and min. boom extension at max. boom angle					x
	Least stable combination	x		x		
	Travel		x		x	
Position of fork arms	Horizontal	x	x	x		x
	Full rearward				x	
Stabilizer device and/or axle-locking device (if so equipped)	With	x		x		
	Without	x	x	x	x	x
Lateral frame levelling device (if so equipped)	With			x		
	Without	x	x	x	x	x
Tilt-table angle for actual capacity	≤ 10 000 kg	4 %	18 %	6 %	(15 + 1,4 _v) % max. 50 %	6 %
	>10 000 kg	3,5 %			(15 + 1,4 _v) % max. 40 %	
v maximum travel speed of the unladen truck, km/h						

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Table 1 (continued)

Test criteria	Test 1	Test 2	Test 3	Test 4	Test 5
Truck position on tilt table	 <p>X-Y</p>	 <p>X-Y</p>	 <p>X-Y</p>	 <p>X-Y</p>	 <p>X-Y</p>
	 <p>X Y</p>	 <p>X Y</p>	 <p>X Y</p>	 <p>X Y</p>	 <p>X Y</p>
	<p>Articulating steer axle — As per 4.2.3 a)</p>	<p>Articulating chassis — As per 4.2.3 b)</p>	<p>Two-wheel steer</p>	<p>Four-wheel steer</p>	<p>Articulating chassis — As per 4.2.3 b)</p>