INTERNATIONAL STANDARD

ISO 22915-3

Third edition
2021-06

Industrial trucks — Verification of stability —

Part 3: Reach and straddle trucks

Chariots de manutention — Vérification de la stabilité —

Partie 3: Chariots rétractables et à fourche entre longerons

Reference number
ISO 22915-3:2021(E)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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

This third edition cancels and replaces the second edition (ISO 22915-3:2014), which has been technically revised.

The main changes compared to the previous edition are as follows:

— Clause 2 has been updated;

— the regional requirements for Australia have been changed (specific requirement deleted);

— the maximum tilt angle for test 8 has been deleted.

A list of all parts in the ISO 22915 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Industrial trucks — Verification of stability —

Part 3:
Reach and straddle trucks

1 Scope

This document specifies the tests for verifying the stability of reach trucks (with retractable mast or fork arm carriage) and straddle trucks, equipped with tilting or non-tilting masts or fork arms and having a rated capacity up to and including 5 000 kg.

It is also applicable to such trucks operating under the same conditions when equipped with load-handling attachments.

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.

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

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 5053-1 and ISO 22915-1 apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Test conditions

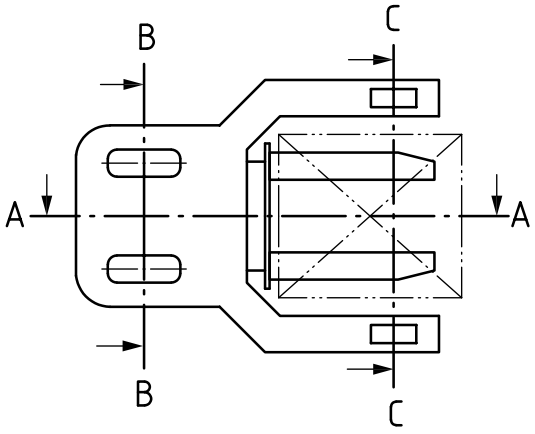
4.1 General

See ISO 22915-1.

4.2 Position of truck on tilt table

4.2.1 Load and drive/steer axles

The load and drive/steer axles are shown in Figure 1.



Key

A–A longitudinal centre plane of truck

B–B drive/steer axle

C–C load axle

Figure 1 — Load and drive/steer axles

4.2.2 Tests 1, 2, 6, 7 and 8

The truck shall be positioned on the tilt table so that its drive/steer axle, B–B, and load axle, C–C, 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 with the line, M–N, parallel to the tilt axis, X–Y, of the tilt table (see Table 1).

Point M is defined as follows.

a) For trucks with a single non-articulating drive (steer) wheel: point M shall be the vertical projection onto the tilt table of the point of intersection between the centreline of the drive/steer axle and the centreline of the drive wheel width.

b) For trucks with a non-sprung castor wheel:

   1) for tests carried out on the castor wheel side of the truck, point M shall be the vertical projection onto the tilt table of the point of intersection between the centreline of the castor wheel axle and the midpoint between the castor wheel or the two castor wheels, with the non-sprung castor being positioned with the centreline of the castor wheel axle nearer to the centre plane of the truck;

   2) for tests carried out on the drive (steer) wheel side of the truck, point M shall be the vertical projection onto the tilt table of the point of intersection between the centreline of the drive/steer axle and the centreline of the drive wheel width.

c) For trucks with a drive/steer axle in an articulating frame articulated in the centre plane of the truck: point M shall be the vertical projection onto the tilt table of the point of the intersection between the lateral axis of the articulating frame and the centre plane, A–A, of the truck.

d) For trucks with a sprung castor wheel and a single non-sprung drive (steer) wheel: point M shall be the vertical projection onto the tilt table of the point of intersection between the centreline of the drive wheel axle and the centreline of the drive wheel width, with the axle of the drive wheel positioned at right angles to the tilt axis.

e) For trucks with non-articulated dual drive (steer) wheels in pivoting mounting: point M shall be the vertical projection onto the tilt table of the point of intersection between the centreline of the drive axle and the centreline of the width of the drive wheel closer to the tilt axis, with the axle of the drive wheels positioned at right angles to the tilt axis.

f) For trucks with non-articulated, non-sprung chassis castors: point M shall be the vertical projection onto the tilt table of the point of intersection between the centreline of the castor wheel width, with the non-sprung castor positioned with the centreline of the castor wheel axle nearer to the centre plane of the truck.

g) For trucks with a non-articulated, single-drive wheel (steered) on the centre plane, A–A, and sprung castor wheels: point M shall be the vertical projection onto the tilt table of the point of intersection between the centreline of the drive wheel axle and the centreline of the drive wheel width, with the axle of the drive wheel positioned at right angles to the tilt axis. The castor wheel closest to the tilt axis shall be positioned at right angles to the tilt axis and the castor wheel axle shall be nearer to the centre plane of the truck.

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 front wheel closest to the tilt axis, X–Y, of the tilt table.

4.3 Horizontal position of load datum point

Test 1 can be conducted with the horizontal position of the load datum point, E, unchanged when elevated from its lowered position as shown in Figure 2.

With the prescribed test load, set the mast vertical and then elevate to approximately 300 mm above the tilt table. With the shank of the front face of the fork arm set vertical, establish point E, as shown in Figure 2 a) and b), on the fork arms or fork carrier having a fixed relationship to the centre of gravity of the test load. Point E shall be used to provide a reference datum point, F, on the tilt table. When the mast is elevated, a new point, F1, on the tilt table can occur, as shown in Figure 2 c) and d). This new point can be returned to the original location of F, as shown in Figure 2 e) and f).

For trucks with tilting masts, changes in the location of F_1 can be corrected by varying the tilt of the mast within the limits provided by the design of the truck [see Figure 2 a), c) and e)].

For trucks with non-tilting masts, adjustments in the fork arms or fork carrier tilt, fork carrier retraction (where provided) or retraction of the mast may be used to correct for changes in the location of point F_1, within the limits provided by the design of the truck [see Figure 2 b), d) and f)].

In North America, the location of F_1 shall not be corrected. Only correction by varying the mast tilt is permissible.

4.4 Lift height for tests simulating travel

For tests simulating travel (Tests 2, 5 and 8), the upper face of the fork arms, measured at the heel of the fork arm, shall be positioned 300 mm above the tilt table.

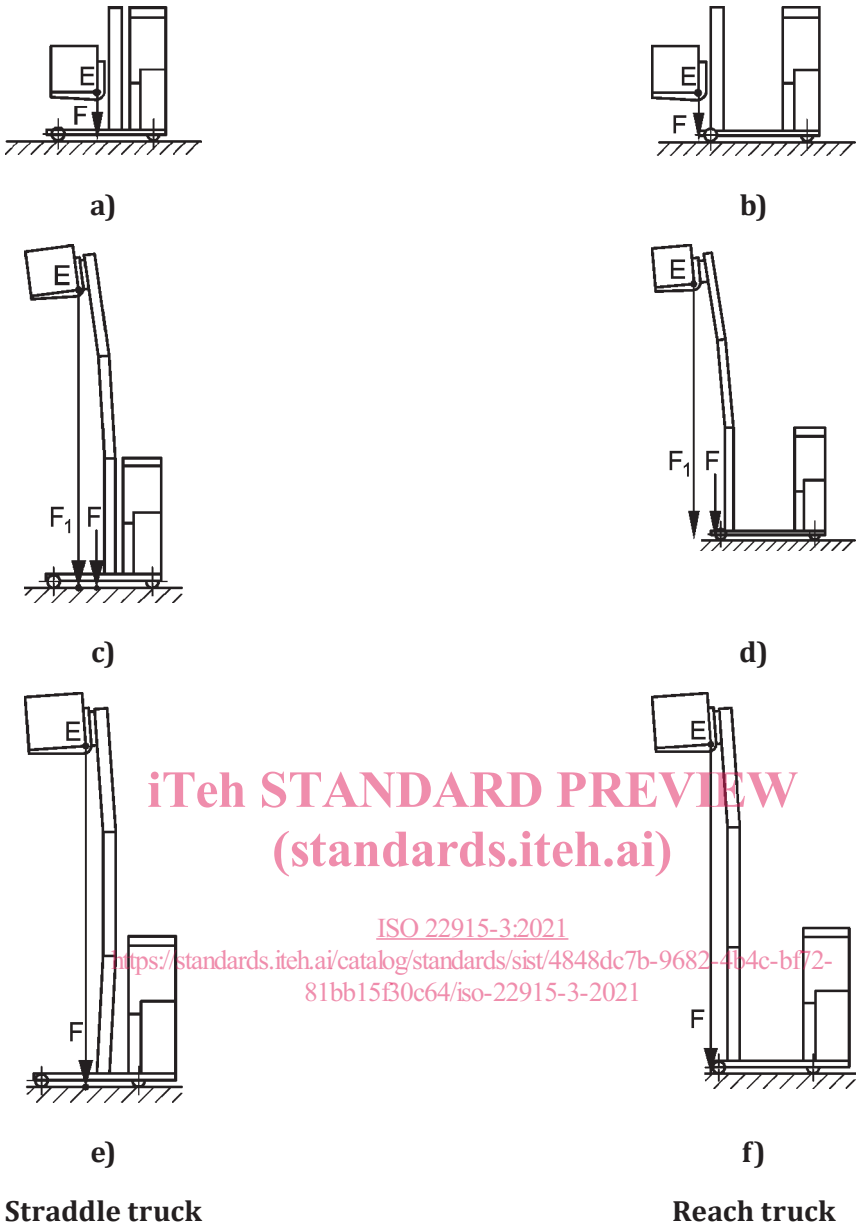
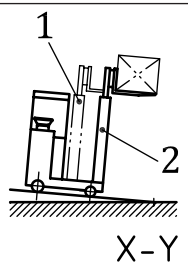
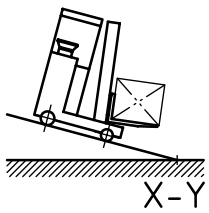
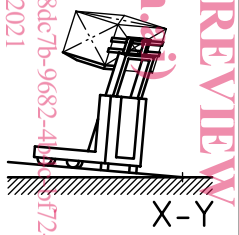
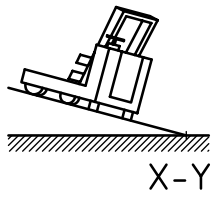
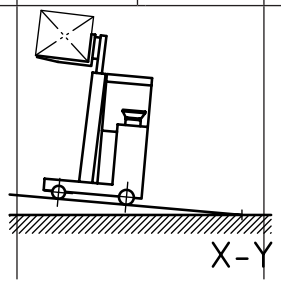
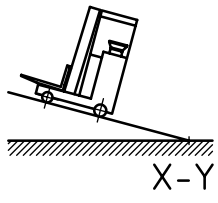


Figure 2 — Datum point positions

5 Verification of stability

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

Table 1 — Verification of stability

Test criteria		Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8
Direction of test	Longitudinal	×	×				×	×	×
	Lateral			×	×	×			
Direction of load-handling device	Load leading	×	×						
	Load trailing						×	×	×
Mode of operation	Travelling		×			×			×
	Stacking/ retrieving	×		×	×		×	×	
Load at load centre	With	×	×	×			×		
	Without				×	×		×	×
Lift height	Maximum	×		×	×		×	×	
	Travel		×			×			×
Position of load-carrying device	Extendable	×[a]							
	Retractable		×	×	×	×	×	×	×
Position of mast	Vertical	×		b	b	b			
	Full rearward		×	b	b	b			
Tilt table angle		4 %	18 %	6 %	8 %	(15 + 1,1 *v*) % or 50 % max.	14 %	14 %	(15 + 0,5*i* + 1,55 *v*) %
Truck position on tilt table									

Key

1 position for straddle trucks

2 extended (for reach trucks)

v maximum travel speed of unladen truck, km/h

i maximum gradient, expressed as a percentage, on which unladen truck is designed to travel

[a] For reach trucks only.

[b] When the truck is equipped with a tilting mast or tilting fork arms, these shall be positioned so that the truck is at its least stable.

[c] Parallel.

[d] Any position.

Table 1 *(continued)*

Test criteria	Tests 1, 2, 6, 7 and 8
Truck position on tilt table	 **As per 4.2.2 — Tests 1 and 2**  **As per 4.2.2 — Tests 6, 7 and 8** **Key** 1 articulated steering and driving axle (any wheel position permitted in test) 2 non-articulated, non-sprung castors (any wheel position permitted in test) 3 non-articulated, non-sprung castors turned towards load 4 articulated steering and driving axle (longitudinal direction)

[a] For reach trucks only.

[b] When the truck is equipped with a tilting mast or tilting fork arms, these shall be positioned so that the truck is at its least stable.

[c] Parallel.

[d] Any position.