INTERNATIONAL STANDARD

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Industrial trucks — Verification of stability —

Part 16: Pedestrian-propelled trucks

Chariots de manutention — Vérification de la stabilité —

Partie 16: Chariots à conducteur accompagnant

Reference number
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Contents

Page

Foreword

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The committee responsible for this document is ISO/TC 110, *Industrial trucks*, Subcommittee SC 2, *Safety of industrial trucks*.

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

— *Part 1: General*

— *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 5: Single-side-loading trucks*

— *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 9: Counterbalanced trucks with mast handling freight containers of 6 m (20 ft) length and longer*

— *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 12: Industrial variable-reach trucks handling freight containers of 6 m (20 ft) length and longer*

— *Part 13: Rough-terrain trucks with mast*

— *Part 14: Rough-terrain variable-reach trucks*

— *Part 15: Counterbalanced trucks with articulated steering*

— *Part 16: Pedestrian-propelled 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*

— *Part 22: Lateral- and front- stacking trucks with and without elevating operator position*

The following parts are under preparation:

— *Part 24: Slewing variable-reach trucks*

Industrial and RTT lorry-mounted trucks are to form the subject of a future part 23.

Industrial trucks — Verification of stability —

Part 16: Pedestrian-propelled trucks

1 Scope

This part of ISO 22915 specifies tests for verifying the stability of pedestrian-propelled trucks.

It is applicable to

— straddle, pallet and platform stacker trucks with capacities not exceeding 1 000kg, with manual or battery-powered lift;

— scissors lift pallet trucks with lift heights up to 1 000 mm and rated capacity up to 1 000kg, with manual or battery-powered lift;

— platform trucks.

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

It is not applicable to trucks with retractable devices such as a mast or fork.

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.

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

ISO 3691-5:2014, *Industrial trucks — Safety requirements and verification — Part 5: Pedestrian-propelled trucks*

ISO 5053, *Powered industrial trucks — Terminology*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5053 and ISO 22951-1 apply.

4 Requirements

4.1 General

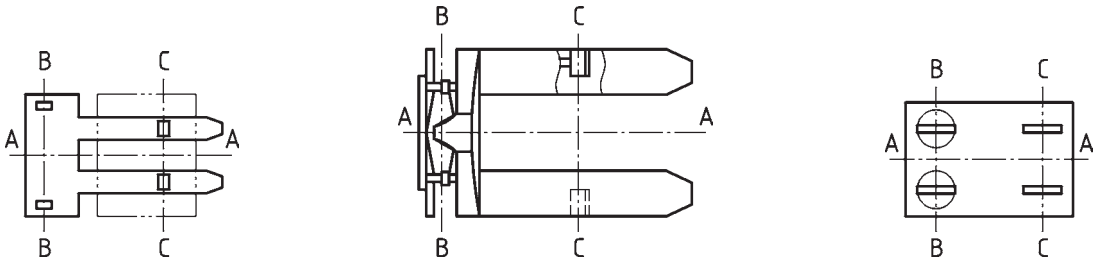
See ISO 22915-1.

4.2 Position of the truck on the tilt table

All tests shall be carried out with castors and swivelling wheels, when fitted, in the position of least stability (see Tables 1, 2 and 3).

4.2.1 Load and steer axles

The load and steer axles are defined by Figure 1.



Stacker truck **Scissors lift truck** **Platform truck**

Key

A–A longitudinal centre plane of the truck

B–B steer axle

C–C load axle

Figure 1 — Load and steer axles

4.2.2 Tests 1, 2, 4 and 7 to 10 for longitudinal direction of test

The truck shall be positioned on the tilt table with the steer axle B–B and the load axle C–C parallel to the tilt axis X–Y of the tilt table.

4.2.3 Tests 3, 5, 6 and 7 to 10 for lateral direction of test

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.

Point M is defined as follows:

a) **For trucks with one or more non-sprung castor wheels**, point M is the vertical projection onto the tilt table of the point of intersection between the centreline of the castor wheel axle and the midpoint of the wheel(s), with the non-sprung castor being positioned with the centreline of the castor wheel axle parallel to tilt axis X–Y or at any other orientation that produces minimum stability.

b) **For trucks having non- articulating dual steer wheels**, point M is the vertical projection onto the tilt table of the point of intersection between the centreline of the steer axle and the centreline of the width over both steer wheels, with the axle of the steer wheels positioned parallel to the tilt axis X–Y or at any other orientation that produces minimum stability.

c) **For trucks with stabilizers**, point M is the vertical projection onto the tilt table of the point of symmetry of the stabilizer contact surface.

Point N is defined as the centre point of the area of contact between the tilt table surface and the load wheel nearest to the tilt axis X–Y of the tilt table.

5 Verification of stability

5.1 Dynamic test — Platform trucks

This dynamic test applies only to platform trucks.

The unladen truck moving at a stabilized speed of 1 m/s ± 10 % shall be pushed into a vertical obstacle 20 mm high with its wheel or both wheels at the same time. The force to push the truck shall cease when the truck hits the obstacle. The force to move the platform shall be applied at the lower platform (see Figure 2). This test shall be carried out in both directions, i.e. pushed and pulled.

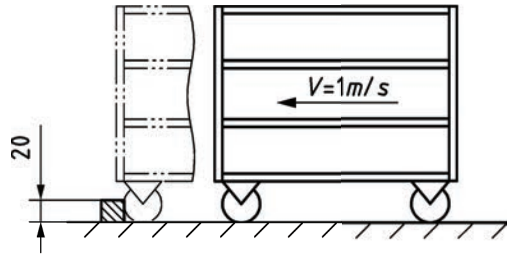


Figure 2 — Dynamic test

The unladen truck shall not tip over after coming into contact with the obstacle.

5.2 Tilt table tests

The stability of a truck shall be verified according to Tables 1, 2 or 3, as applicable.

Table 1 — Verification of stability — Stacker trucks

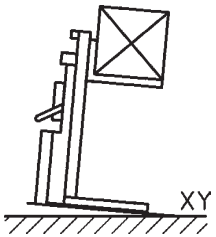
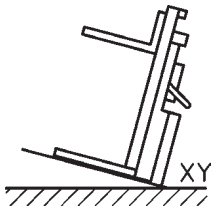
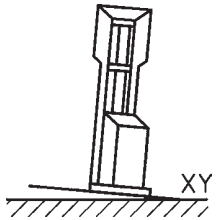
Test criteria		Test 1	Test 2	Test 3
Direction of test	Longitudinal	x	x	
	Lateral			x
Direction of load-handling device	Load leading	x		
	Load trailing		x	
Mode of operation	Travelling			
	Stacking/retrieving	x	x	x
Load at load centre D	With	x See ISO 3691-5:2014, Table B.1.		x See ISO 3691-5:2014, Table B.1.
	Without		x	
Lift height	Maximum	x	x	x
Tilt table angle		4 %	14 %	3,5 %
Truck position on tilt table				

Table 1 — *(continued)*

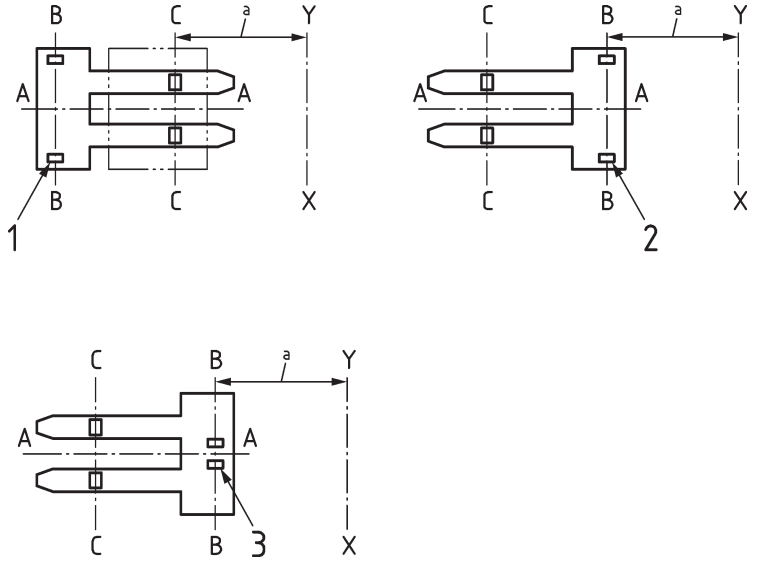
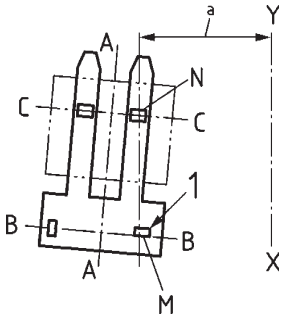
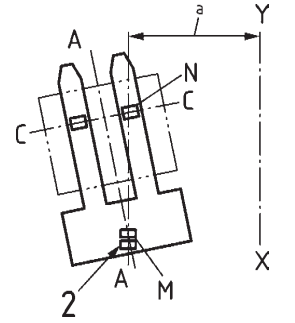
Test criteria	Test 1	Test 2	Test 3
Truck position on tilt table	 1 non-articulated, non-sprung castors (any position) 2 non-articulated, non-sprung castors turned towards load axle C–C 3 dual-steer wheel axle parallel to the tilt axis X–Y		 **As per 4.2.3 a)**  **As per 4.2.3 b)** 1 non-articulated, non-sprung castor wheel axle parallel to X–Y or at angle that produces minimum stability 2 non-articulating dual-steer wheel axle parallel to tilt axis X–Y
a Parallel.			

Table 2 — Verification of stability — Scissors lift trucks

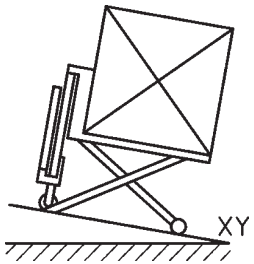
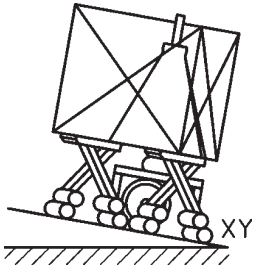
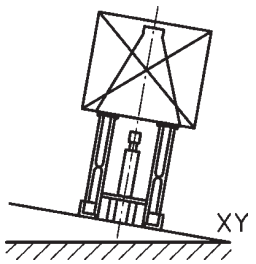
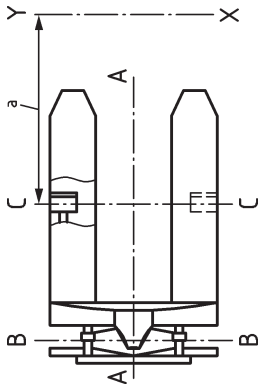
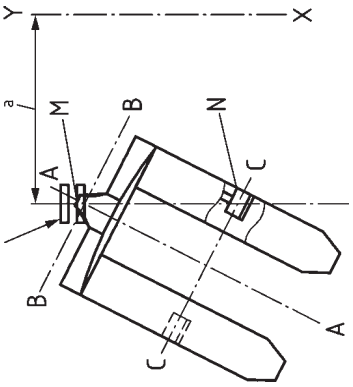
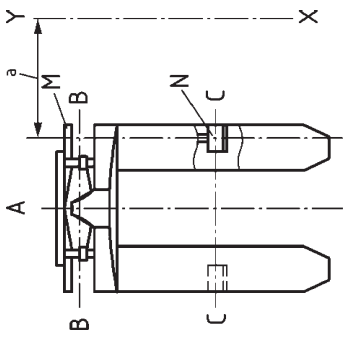
Test criteria		Test 4	Test 5	Test 6
Direction of test	Longitudinal	x		
	Lateral		x	x
Direction of load-handling device	Load leading	x	x	
	Load trailing			
Mode of operation	Travelling	x	x	x
Load at load centre	With	x	x	x
	Without			
Lift height	Maximum	x		x
	Maximum for rolling without stabilizers		x	
Tilt table angle	If truck cannot be moved in fully raised position	10 %	6 %	6 %
	If truck can be moved in fully raised position	12 %		
Truck position on tilt table				

Table 2 — *(continued)*

Test criteria	Test 4	Test 5	Test 6
Truck position on tilt table		 **As per 4.2.3 b)** 1 non-articulating dual-steer wheel axle parallel to tilt axis	 **As per 4.2.3 c)**

a Parallel.

Table 3 — Verification of stability — Platform trucks

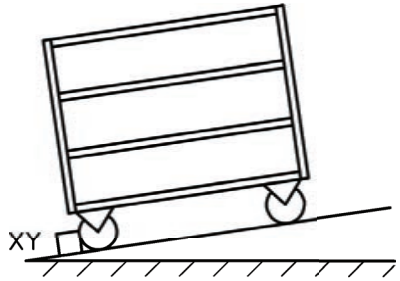
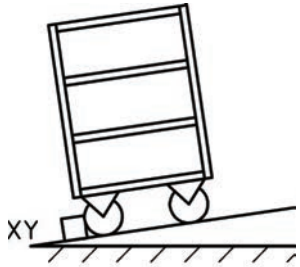
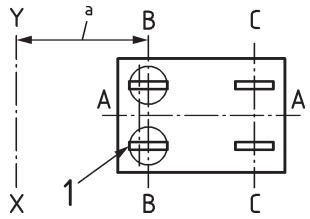
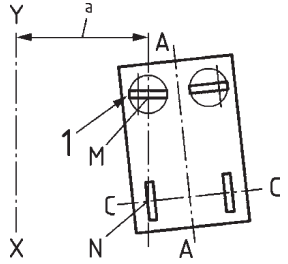
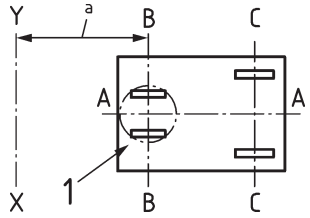
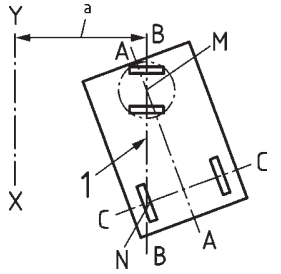
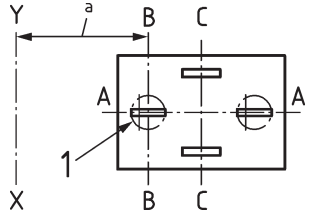
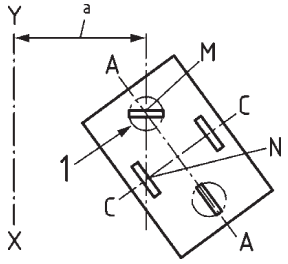
Test criteria		Test 7	Test 8	Test 9	Test 10
Direction of test	Longitudinal	x	x	x	x
	Lateral	x	x	x	x
Direction of load-handling device	Load centred		x	x	x
Mode of operation	Travelling	x	x	x	x
Load at load centre	Without	x			
	With rated load on top loading surface		x		
	With rated load uniformly distributed on all loading surfaces			x	
	With rated load divided by number of loading surfaces placed on top loading surface (other surfaces empty)				x
Tilt table angle	Longitudinal	36 %	18 %	27 %	18 %
	Lateral	23 %	18 %	23 %	18 %
Truck position on tilt table Select for appropriate truck type		**Longitudinal**  		**Lateral**  	

Table 3 — *(continued)*

Test criteria	Test 7	Test 8	Test 9	Test 10
Truck position on tilt table Select for appropriate truck type	**Longitudinal**		**Lateral**	
	 1 non-articulated, non-sprung castor wheel turned towards and parallel with load axle C–C		 1 non-articulated, non-sprung castor wheel axle turned towards A–A and parallel to X–Y or at the angle that produces minimum stability	
	 1 steer axle B–B parallel to tilt axis X–Y		 1 steer axle B–B parallel to tilt axis X–Y	
	 1 non-articulated, non-sprung castor wheel turned towards and parallel with load axle C–C		 1 non-articulated, non-sprung castor wheel axle turned towards load axle C–C and parallel with X–Y	
a Parallel.				

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