भारतीय मानक **IS/ISO 22915-16 : 2014**

Indian Standard

औद्योगिक ट्रक — स्थिरता का सत्यापन
भाग 16 पेडेस्ट्रियन ट्रक

Industrial Trucks — Verification of Stability
Part 16 Pedestrian-Propelled Trucks

ICS 53.060

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
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June 2023 **Price Group 7**

Transport Tractors, Trailors and Industrial Trucks Sectional Committee, TED 22

NATIONAL FOREWORD

This Indian Standard (Part 16) which is identical with ISO 22915-16 : 2014 'Industrial trucks — Verification of stability — Part 16: Pedestrian-propelled trucks', issued by the International Organization for Standardization (ISO), was adopted by the Bureau of Indian Standards after the draft finalized by the Transport Tractors, Trailers and Industrial Trucks Sectional Committee and had been approved by Transport Engineering Division Council.

The text of ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain terminologies and conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker, while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

The technical committee has reviewed the provisions of the following International Standard referred in this adopted standard and has decided that it is acceptable for use in conjunction with this standard:

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

In this adopted standard, references appear to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 5053 : 1987 Powered Industrial trucks — Terminology	IS 4660 : 1993 Powered industrial trucks — Terminology	Technically Equivalent
ISO 22915-1 : 2016 Industrial trucks — Verification of stability — Part 1: General	IS 17516 (Part 1) : 2021 ISO 22915-1 : 2016 Industrial trucks verification of stability: Part 1 General	Identical

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values *(second revision)'*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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Indian Standard

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

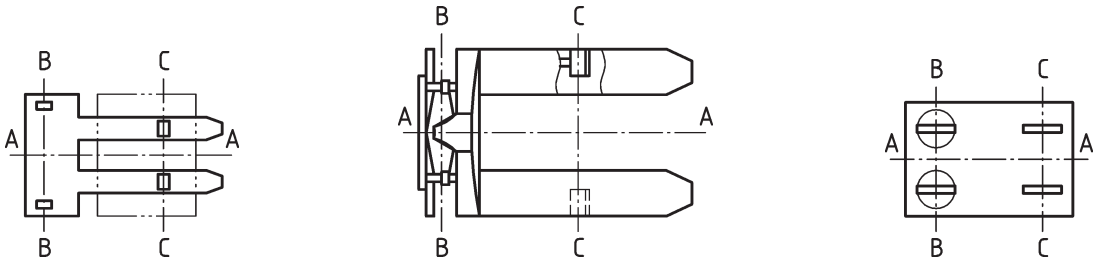
See ISO 22915-1.

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.

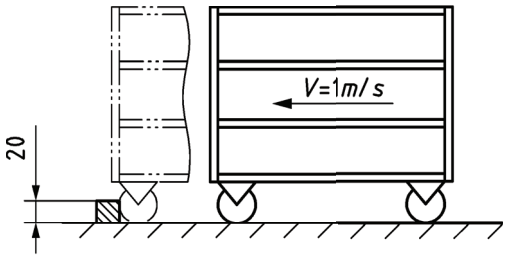


Figure 2 — Dynamic test

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

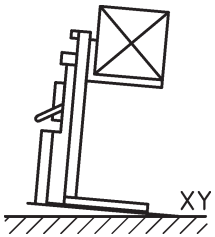
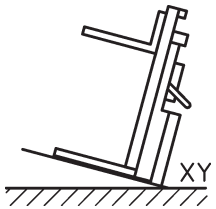
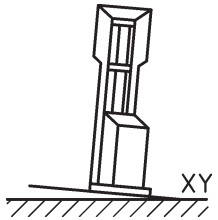
Test criteria		Test 1	Test 2	Test 3
Direction of test	Longitudinal	x	x	
	Lateral			x
Direction of load-handling device	Load leading	x		
	Load trailing		x	
Mode of operation	Travelling			
	Stacking/retrieving	x	x	x
Load at load centre D	With	x See ISO 3691-5:2014, Table B.1.		x See ISO 3691-5:2014, Table 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)*

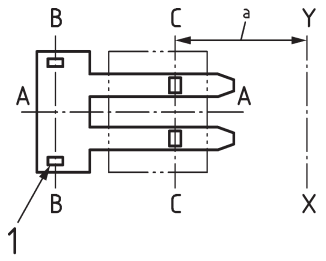
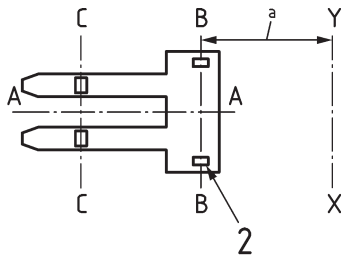
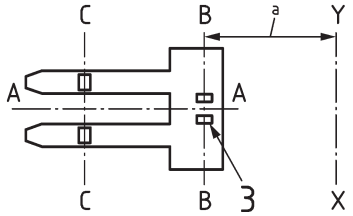
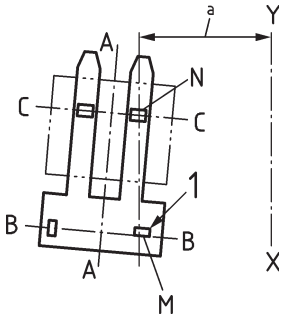
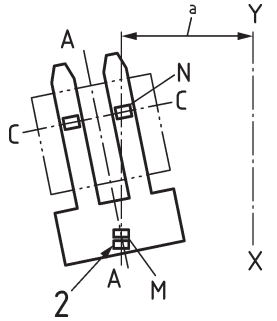
Test criteria	Test 1	Test 2	Test 3
Truck position on tilt table	   1 non-articulated, non-sprung castors (any position) 2 non-articulated, non-sprung castors turned towards load axle C–C 3 dual-steer wheel axle parallel to the tilt axis X–Y		 **As per 4.2.3 a)**  **As per 4.2.3 b)** 1 non-articulated, 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

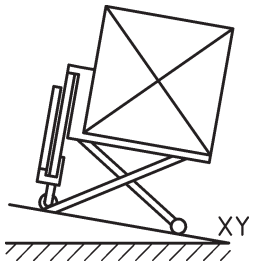
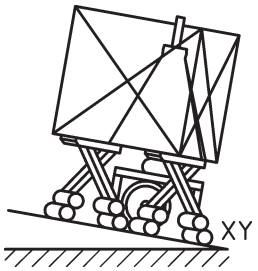
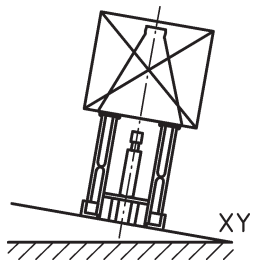
Test criteria		Test 4	Test 5	Test 6
Direction of test	Longitudinal	x		
	Lateral		x	x
Direction of load-handling device	Load leading	x	x	
	Load trailing			
Mode of operation	Travelling	x	x	x
Load at load centre	With	x	x	x
	Without			
Lift height	Maximum	x		x
	Maximum for rolling without stabilizers		x	
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)*

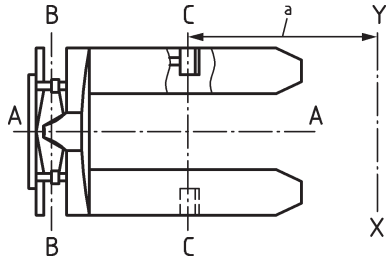
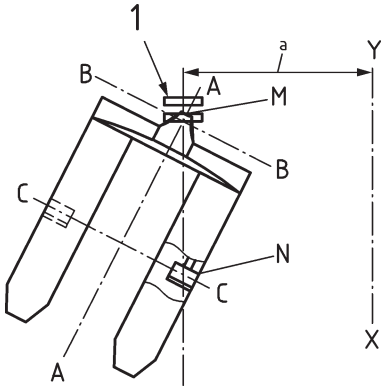
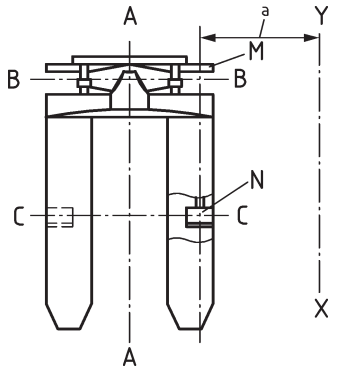
Test criteria	Test 4	Test 5	Test 6
Truck position on tilt table		 **As per 4.2.3 b)** 1 non-articulating dual-steer wheel axle parallel to tilt axis	 **As per 4.2.3 c)**
[a] Parallel.			

Table 3 — Verification of stability — Platform trucks

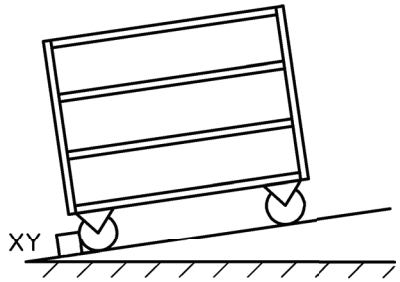
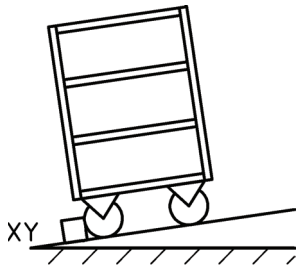
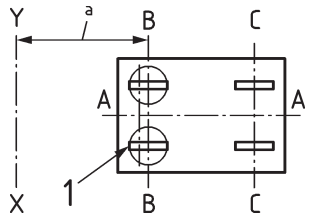
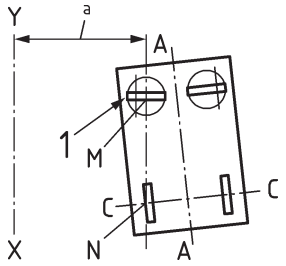
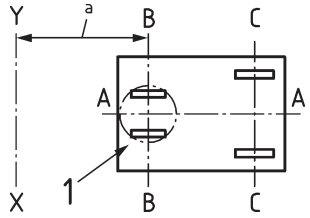
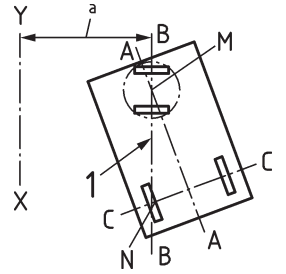
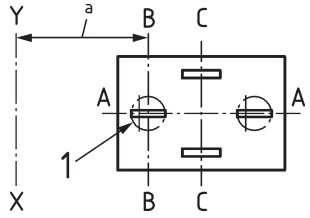
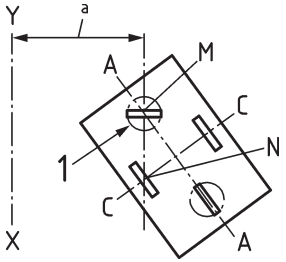
Test criteria		Test 7	Test 8	Test 9	Test 10
Direction of test	Longitudinal	x	x	x	x
	Lateral	x	x	x	x
Direction of load-handling device	Load centred		x	x	x
Mode of operation	Travelling	x	x	x	x
Load at load centre	Without	x			
	With rated load on top loading surface		x		
	With rated load uniformly distributed 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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This Indian Standard has been developed from Doc No.: TED 22 (19380).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Published by BIS, New Delhi