भारतीय मानक

Indian Standard

IS 15611 (Part 1) : 2024
ISO 22915-5 : 2020

औद्योगिक ट्रक — स्थिरता का सत्यापन

भाग 1 सिंगल-साइड-लोडिंग वाले ट्रक

(दूसरा पुनरीक्षण)

Industrial Trucks — Verification of Stability

Part 1 Single-Side-Loading Trucks

(Second Revision)

ICS 53.060

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
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NEW DELHI - 110002
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September 2024 **Price Group 7**

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

NATIONAL FOREWORD

This Indian Standard (Part 1) (Second Revision) which is identical to ISO 22915-5 : 2020 'Industrial trucks — Verification of stability — Part 5: Single-side-loading trucks' issued by International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Transport Tractors, Trailers and Industrial Trucks Sectional Committee and approval of the Transport Engineering Division Council.

This standard was first published in 2005 and was identical with ISO 13563-1 : 2001. Subsequently ISO 13563-1 : 2001 was withdrawn and published as ISO 22915-5 : 2014. The first revision was undertaken to align with ISO 22915-5 : 2014. This revision has been brought out to align it with the latest version of ISO 22915-5 : 2020.

The main change compare to the previous edition is the update of Clause 2 following the replacement of ISO 5053 by ISO 5053-1.

This standard is one of the standards on subject 'Industrial trucks — Verification of stability'. The other Indian Standards published on this subject are as follows:

IS No.	*Title*
IS 4357 : 2017/ ISO 22915-2 : 2008	Industrial trucks — Counterbalanced trucks with mast — Verification of stability (*third revision*)
IS 7309 : 2018/ ISO 22915-3 : 2014	Industrial trucks — Verification of stability reach and straddle trucks (*second revision*)
IS 7552 : 2018/ ISO 22915-8 : 2018	Industrial trucks — Verification of stability — Additional stability test for trucks operating in the special condition of stacking with mast tilted forward and load elevated (*second revision*)
IS 7631 : 2018/ ISO 22915-3 : 2014	Industrial trucks — Pallet stackers, double stackers and order-picking trucks with operator position elevating up to and including 1 200 mm lift height — Verification of stability (*second revision*)
IS 12726 : 2018/ ISO 22915-21 : 2009	Industrial trucks — Order-picking trucks with operator position elevating above 1 200 mm — Verification of stability (*first revision*)
IS 13302 (Part 1) : 2018/ ISO 22915-13 : 2012	Industrial trucks — Verification of stability: Part 1 Rough-terrain trucks with mast (*second revision*)
IS 13302 (Part 2) : 2018/ISO 22915-14 : 2010	Industrial trucks — Verification of stability: Part 2 Rough-terrain variable-reach trucks (*second revision*)
IS 15514 : 2018/ ISO 22915-10 : 2008	Industrial trucks — Verification of stability — Additional stability test for trucks operating in the special condition of stacking with load laterally displaced by powered devices (*first revision*)
IS 17516 (Part 1) : 2021/ISO 22915-1 : 2016	Industrial trucks — Verification of stability: Part 1 General
IS/ISO 22915-7 : 2016	Industrial trucks — Verification of stability: Part 7 Bidirectional and multidirectional

(*Continued on third cover*)

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Indian Standard

INDUSTRIAL TRUCKS — VERIFICATION OF STABILITY

PART 1 SINGLE-SIDE-LOADING TRUCKS

(Second Revision)

1 Scope

This document specifies the tests to verify the stability of single-side-loading trucks with tiltable or non-tiltable mast or fork arms.

It is applicable to trucks fitted with fork arms and/or 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 3691-1, *Industrial trucks — Safety requirements and verification — Part 1: Self-propelled industrial trucks, other than driverless trucks, variable-reach trucks and burden-carrier trucks*

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

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

3 Terms and definitions

For the purpose 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/

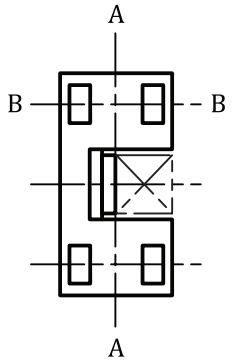
4 Test conditions

4.1 General

See ISO 22915-1.

4.2 Position of the truck on the tilt table

The indication of the articulating steer axle is the centre line of the axle. The allocation of the indication is defined in Figure 1.



Key

A-A longitudinal centre plane of the truck

B-B articulating steer axle

Figure 1 — Articulating steer axle, longitudinal centre plane

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 N is the centre point of the area of contact between the tilt table surface and a non-articulating wheel or stabilizer pad. Point M is defined as follows.

a) For trucks with an articulating steer axle, B-B, designed to articulate approximately about the longitudinal centre plane of the truck, A-A, the projection onto the tilt table of the point of intersection of the longitudinal centre plane of the truck with the axis of this articulating axle (see Figure 1).

b) For trucks without an articulating axle or with axle locks or stabilizers in use, the centre point of the area of contact between the tilt table surface and another wheel or stabilizer pad.

When the truck rating is related to the use of stabilizers, suspension locks, etc., such devices shall be used during the tests. If the truck can be used without their engagement, an additional test shall be carried out in this condition.

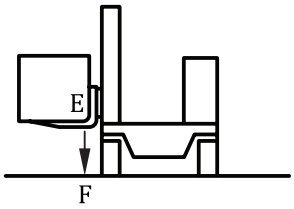
4.3 Position of the load datum point

Tests 1 and 5 shall be conducted with the horizontal position of the load datum point, E (see Figures 2, 3, and 4) unchanged when elevated from its lowered position.

By means of a plumb-line or other suitable equipment, set the mast vertical. Elevate the fork and the prescribed test load to approximately 300 mm above the tilt table. With the front face of the fork arm shank vertical, establish a point, E on the fork 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, F, on the tilt table. When the mast is elevated, a new point, F_1, on the tilt table can occur, as shown in Figure 3. By the following adjustments this new point, F_1, can be returned to the original location of F.

For trucks with tiltable masts, changes in the location of F_1 shall be corrected by varying the tilt of the mast within the limits provided by the design of the truck.

Adjustments cannot be made on trucks having non-tiltable masts or fork carrier. Mast retraction is not permitted.

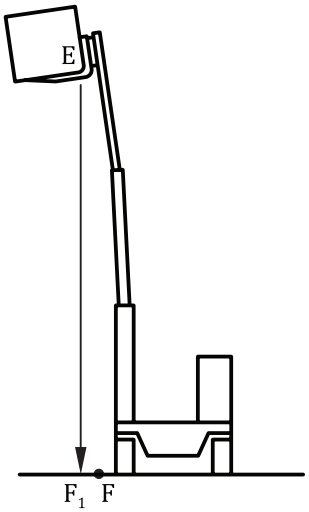


Key

E point on the inside heel of the fork arm

F reference datum on tilt table

Figure 2



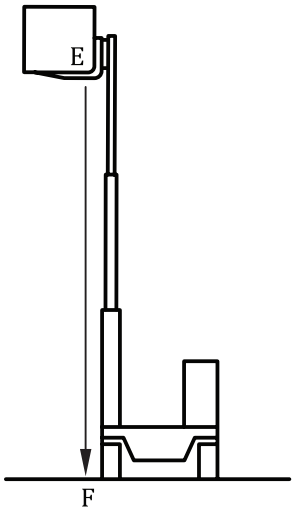
Key

E point on the inside heel of the fork arm

F reference datum on tilt table

F_1 new point on the tilt table

Figure 3



Key

E point on the inside heel of the fork arm

F reference datum on tilt table

Figure 4

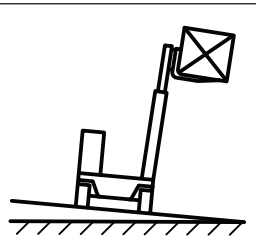
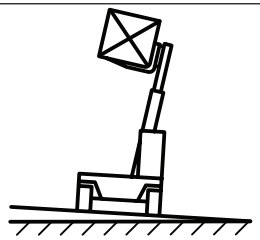
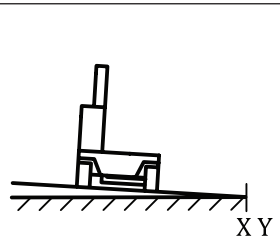
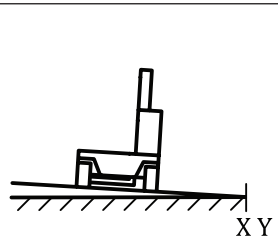
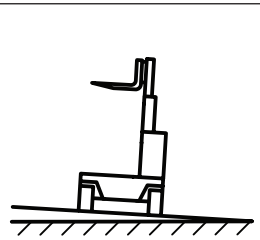
5 Verification of stability

The stability shall be verified according to 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 3691-1.

Table 1 — Verification of stability

Test criteria		Test 1	Test 2	Test 3[a]	Test 4[a]	Test 5
Direction of test	Lateral	x	x	x	x	x
Mode of operation	Travelling			x	x	
	Stacking	x	x			x
Load at load centre	With	x	x			
	Without			x	x	x
Lift height	Maximum	x	x			x
	Travel			x [a]	x [a]	
Position of load carrier device	Retracted		x	x	x	x
	Extended	x				
Position of mast	Vertical	x (see 4.3)		Position so that the truck is in the condition of least stability		x (see 4.3)
	Full rearward tilt		x			
Platform slope for rated capacity	<5 000 kg	4 %	(8 + 0,62*v*) % (14 % max.)	(18 + 0,62*v*) % (35 % max.)	(18 + 0,62*v*) % (35 % max.)	(8 + 0,62*v*) % (14 % max.)
	≥5 000 kg	3,5 %				
Truck position on tilt table						

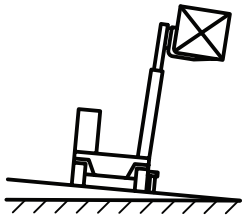
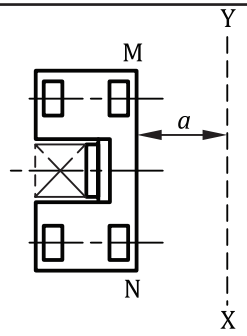
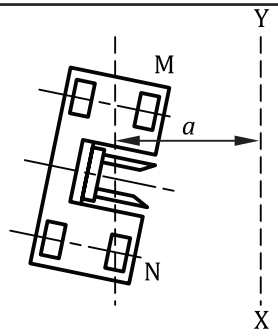
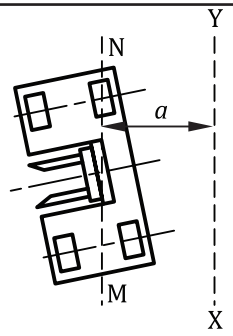
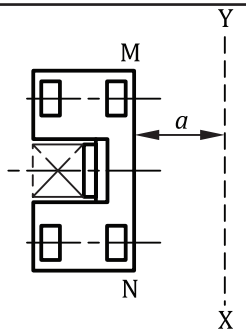
1 stabilizer

v maximum speed of truck, unladen, on smooth, level ground, km/h

a parallel

[a] Travelling with the mast or fork arms tilted backwards if capable, the mast retracted and the forks in the lowered (travelling) position.

Table 1 *(continued)*

Test criteria	Test 1	Test 2	Test 3[a]	Test 4[a]	Test 5
Truck position on tilt table					
		As per 4.2 a)	**As per 4.2 a)**	**As per 4.2 a)**	**As per 4.2 a)**

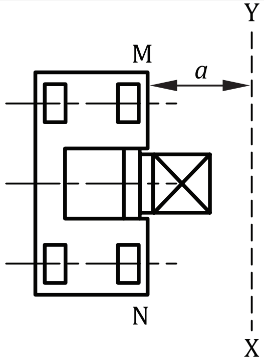
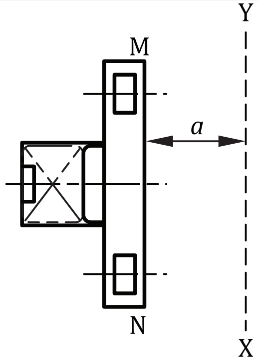
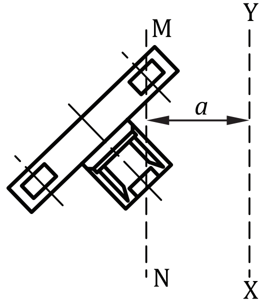
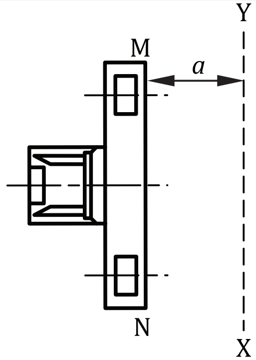
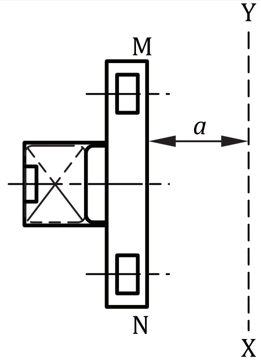
1 stabilizer

v maximum speed of truck, unladen, on smooth, level ground, km/h

a parallel

[a] Travelling with the mast or fork arms tilted backwards if capable, the mast retracted and the forks in the lowered (travelling) position.

Table 1 *(continued)*

<table>
<tr><th>Test criteria</th><th>Test 1</th><th>Test 2</th><th>Test 3[a]</th><th>Test 4[a]</th><th>Test 5</th></tr>
<tr><td rowspan="2">Truck position on tilt table</td><td> 
As per 4.2 b)</td><td> 
As per 4.2 b)</td><td> 
As per 4.2 b)</td><td> 
As per 4.2 b)</td><td> 
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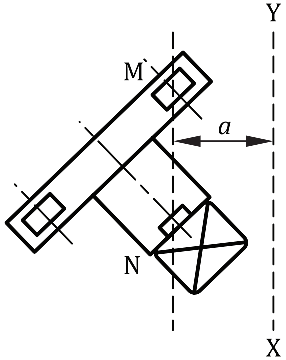
<tr><td> 
As per 4.2 b)</td><td></td><td></td><td></td><td></td></tr>
</table>

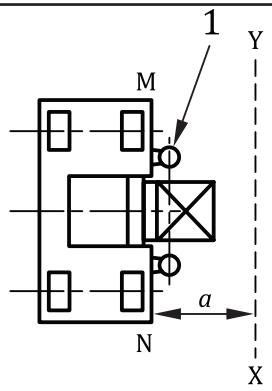
1 stabilizer

v maximum speed of truck, unladen, on smooth, level ground, km/h

a parallel

[a] Travelling with the mast or fork arms tilted backwards if capable, the mast retracted and the forks in the lowered (travelling) position.

Table 1 *(continued)*

Test criteria	Test 1	Test 2	Test 3[a]	Test 4[a]	Test 5
Truck position on tilt table	 **As per 4.2 b)**				

1 stabilizer

v maximum speed of truck, unladen, on smooth, level ground, km/h

a parallel

[a] Travelling with the mast or fork arms tilted backwards if capable, the mast retracted and the forks in the lowered (travelling) position.

Bibliography

[1] ISO 22915-2, *Industrial trucks — Verification of stability — Part 2: Counterbalanced trucks with mast*

[2] ISO 22915-3, *Industrial trucks — Verification of stability — Part 3: Reach and straddle trucks*

[3] ISO 22915-4, *Industrial trucks — Verification of stability — Part 4: Pallet stackers, double stackers and order-picking trucks with operator position elevating up to and including 1 200 mm lift height*

[4] ISO 22915-5, *Industrial trucks — Verification of stability — Part 5: Single-side-loading trucks*

[5] ISO 22915-7, *Industrial trucks — Verification of stability — Part 7: Bidirectional and multidirectional trucks*

[6] ISO 22915-8, *Industrial trucks — Verification of stability — Part 8: Additional stability test for trucks operating in the special condition of stacking with mast tilted forward and load elevated*

[7] ISO 22915-9, *Industrial trucks — Verification of stability — Part 9: Counterbalanced trucks with mast handling freight containers of 6 m (20 ft) length and longer*

[8] ISO 22915-10, *Industrial trucks — Verification of stability — Part 10: Additional stability test for trucks operating in the special condition of stacking with load laterally displaced by powered devices*

[9] ISO 22915-11, *Industrial trucks — Verification of stability — Part 11: Industrial variable-reach trucks*

[10] ISO 22915-13, *Industrial trucks — Verification of stability — Part 13: Rough-terrain trucks with mast*

[11] ISO 22915-14, *Industrial trucks — Verification of stability — Part 14: Rough-terrain variable-reach trucks*

[12] ISO 22915-15, *Counterbalanced trucks with articulated steering*

[13] ISO 22915-16, *Industrial trucks — Verification of stability — Part 16: Pedestrian-propelled trucks*

[14] ISO 22915-17, *Industrial trucks — Verification of stability — Part 17: Towing tractors, burden and personnel carriers*

[15] ISO 22915-20, *Industrial trucks — Verification of stability — Part 20: Additional stability test for trucks operating in the special condition of offset load, offset by utilization*

[16] ISO 22915-21, *Industrial trucks — Verification of stability — Part 21: Order-picking trucks with operator position elevating above 1 200 mm*

[17] ISO 22915-22, *Industrial trucks — Verification of stability — Part 22: Lateral- and front-stacking trucks with and without elevating operator position*

[18] ISO 22915-24, *Industrial trucks — Verification of stability — Part 24: Slewing variable-reach rough-terrain trucks*

(*Continued from second cover*)

IS No.	*Title*
IS/ISO 22915-9 : 2014	Industrial trucks — Verification of stability: Part 9 Counter balanced trucks with mast handling freight containers of 6 m (20 ft) length and longer
IS/ISO 22915-11 : 2011	Industrial trucks — Verification of stability: Part 11 Industrial variable-reach trucks
IS/ISO 22915-12 : 2015	Industrial trucks — Verification of stability: Part 12 Industrial variable-reach trucks handling freight containers of 6 m (20 ft) length and longer
IS/ISO 22915-15 : 2020	Industrial trucks — Verification of stability: Part 15 Counter balanced trucks with articulated steering
IS/ISO 22915-17 : 2020	Industrial trucks — Verification of stability: Part 17 Towing tractors, burden and personnel carriers
IS/ISO 22915-20 : 2008	Industrial trucks — Verification of stability — Part 20: Additional stability test for trucks operating in the special condition of offset load, offset by utilization

The text of the 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'; and

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 Committee has reviewed the provisions of following International Standards referred in this adopted standard and has decided that they are acceptable for use in conjunction with this standard:

International Standard	*Title*
ISO 3691-1	Industrial trucks — Safety requirements and verification — Part 1: Self-propelled industrial trucks, other than driverless trucks, variable-reach trucks and burden-carrier trucks
ISO 5053-1	Industrial trucks — Terminology and classification — Part 1: Types of industrial trucks

In this adopted standard, reference appears 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 22915-1 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

Attention is drawn to the possibility that some of the elements of this standard may be the subject of patent rights. The Bureau of Indian Standards shall not be held responsible for identifying any or all such patent rights.

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off it shall be done in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

This Indian Standard has been developed from Doc No.: TED 22 (22753).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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