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मानक

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Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

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IS 9435 (2004): Terms and Definitions Relating to Dimensions of Road Vehicles Other than 2 and 3 Wheelers [TED 11: Automotive Electrical Equipment]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक

दुपहिया एवं तिपहिया वाहनों को छोड़ कर सड़क वाहनों के
आयाम से संबंधित शब्दावली एवं परिभाषाएँ

(पहला पुनरीक्षण)

Indian Standard

TERMS AND DEFINITIONS RELATING TO
DIMENSIONS OF ROAD VEHICLES OTHER THAN
2 AND 3 WHEELERS

(*First Revision*)

ICS 01.020;43.020

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

AMENDMENT NO. 1 JUNE 2011
TO
IS 9435 : 2004 TERMS AND DEFINITIONS RELATING TO DIMENSIONS
OF ROAD VEHICLES OTHER THAN 2 AND 3 WHEELERS

(First Revision)

(Page 3, clause 5.1.1) — Add following new definitions after 5.1.1:

Clause	Term	Definition	Drawing
5.1.2	<i>Trailer Length</i>	<p>The lengths with and without drawgear, defined as in 5.1.1, the second value being placed in parentheses:</p> <p><i>Example</i> : 5500 (3700)</p> <p>NOTE — To determine the length with drawgear, the drawbar is assumed to be located so that the axis of the drawbar eye or coupling head is vertical and lies within the foremost vertical plane.</p>	
5.1.3	<i>Semi-Trailer Length</i>	<p>The length of the semi-trailer, defined as in 5.1.1, and the distance between kingpin axis and rear end of semi-trailer, the second value being placed in parentheses:</p> <p><i>Example</i>: 10800 (7800)</p>	

(Page 4, clause 5.4.1) — Add following new definitions after 5.4.1:

Clause	Term	Definition	Drawing
5.4.2	<i>Semi-Trailer Wheel Base</i>	<p>The distance from the axis of the fifth wheel kingpin in a vertical position to the vertical plane through the axis of the semi-trailer's first axle.</p> <p>NOTE — In the case of a semi-trailer with two or more axles, the same rule should be applied as for vehicles with three or more axles.</p>	

(Page 6, clause 5.12) — Substitute the following for the existing definitions and drawing:

Clause	Term	Definition	Drawing
5.12	<i>Height of Chassis Above Ground (Commercial Vehicles)</i>	<p>The distance from the ground to the horizontal line perpendicular to the longitudinal median plane (of the vehicle) (see 4) and touching the upper surface of the chassis measured at the axle centre line.</p> <p>NOTES</p> <p>1 In the case of vehicles with more than two axles, the distance is measured at the outermost axles (excluding lifting axles).</p> <p>2 The height of the chassis above the supporting surface should be determined not only with the vehicle loaded to its maximum authorized gross vehicle weight (GVW) but also with the vehicle unladen.</p>	

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Basic Standards Sectional Committee had been approved by the Transport Engineering Division Council.

This standard was first published in 1980. In this revision standard terms and definitions related to dimensions of road vehicles have been updated based on present usage. Definitions pertaining to weights have not been included since. IS 9211 : 2003 'Terms and definitions of weights of road vehicles other than 2 and 3 wheelers', already exists on the subject.

In order to achieve harmony with the international practices, this standard is based on ISO 612 : 1978(E) 'Road vehicles — Dimensions of motor vehicles and towed vehicles — Terms and definitions', issued by the International Organization for Standardization.

The composition of the Committee responsible for formulation of this standard is given in Annex A.

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Indian Standard

TERMS AND DEFINITIONS RELATING TO DIMENSIONS OF ROAD VEHICLES OTHER THAN 2 AND 3 WHEELERS

(First Revision)

1 SCOPE

This standard defines the terms relating to dimensions of road vehicles.

1.1 It does not deal with methods of measurement, the units used in reporting the results, or the accuracy required or the order of magnitude of the dimensions defined.

1.2 Provisions of this standard apply to four wheeler motor vehicles as defined in IS 14272 (Part 1).

1.3 This standard does not cover road vehicles, such as, motor cycles, mopeds or other vehicles, such as, agricultural tractors, which are only incidentally used for the carriage of persons or goods by road or for towing on the road vehicles used for the carriage of persons or goods.

2 REFERENCES

2.1 The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
9211 : 2003	Terms and definitions of weights of road vehicles other than 2 and 3 wheelers (<i>second revision</i>)
14272 (Part1) : 1995	Automotive vehicles — Types — Terminology: Part 1 Three and four wheelers

3 GENERAL

3.1 Unless otherwise stated with regard to one or more of the items mentioned below, it should be understood that:

- a) The supporting surface is horizontal; lengths and widths are measured on the horizontal plane and heights in the vertical plane;

- b) The total weight of the vehicle is the maximum authorised gross vehicle weight (GVW), the load being distributed according to the manufacturer's instructions as per IS 9211;
- c) The tyres are inflated to the pressure corresponding to the maximum authorized gross vehicle weight (GVW) of the vehicle;
- d) The vehicle is stationary, its doors and windows are closed and its wheels and articulated elements are in positions corresponding to movements in a straight line;
- e) All wheels of the vehicle are resting on the ground; and
- f) The expression 'mid-plane of the wheel' that occurs in a number of definitions, designates the plane equidistant from the inner edges of the rim.

4 DEFINITION OF THE LONGITUDINAL MEDIAN PLANE (OF THE VEHICLE) (*see Fig. 1*)

The vertical plane Y passing through the mid-points of *AB* for front and rear axles, perpendicular to *AB*. *A* and *B* being defined as follows:

- a) for each wheel, the vertical plane passing through its axis cuts the mid-plane of the wheel [*see 3 (f)*] following a straight line Δ which meets the supporting surface of the vehicle at one point; and
- b) *A* and *B* are two points thus defined which correspond to two wheels, both of which are either steering or powered wheels, situated respectively at two ends of the same rear or imaginary axle.

NOTES

1 The longitudinal median plane (of the vehicle) is also called 'the longitudinal plane of symmetry' or Zero *Y* plane (*see ISO 4130-1978 'Three dimensional reference system and fiducial marks — Definitions'*).

2 In the case of dual wheels, the mid-plane of the dual wheels is equidistant from the inner edge of one wheel and the outer edge of the other. The straight line Δ is, in this particular case, the intersection of the mid-plane of the dual wheels and the vertical plane passing through the axis of the axle pin.

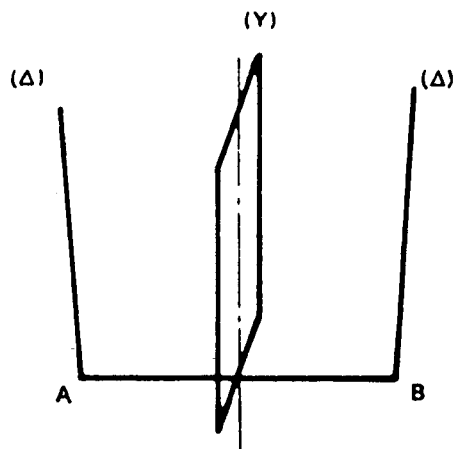
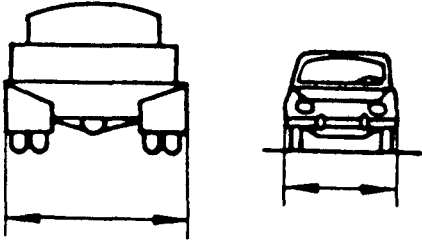
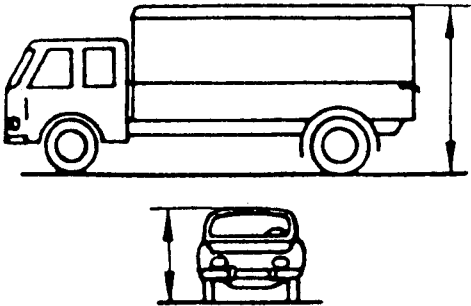
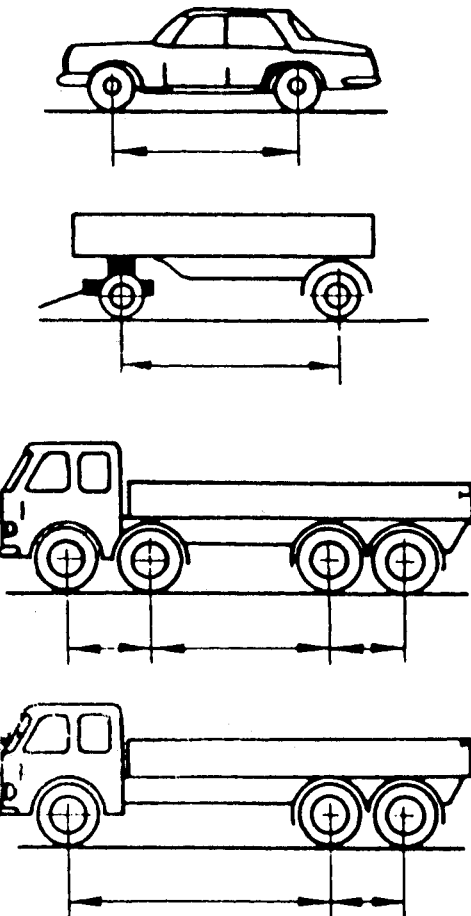


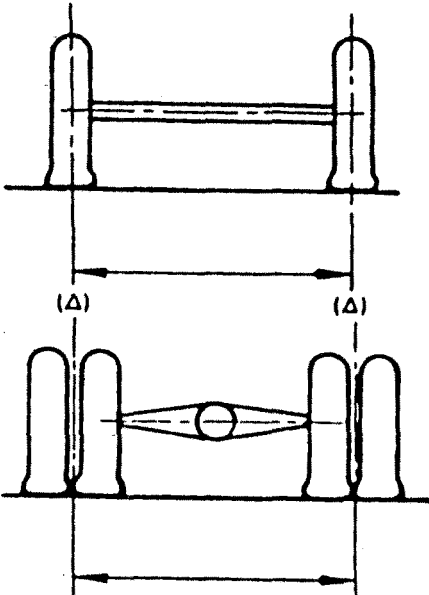
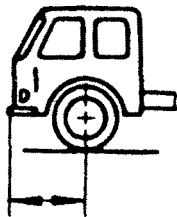
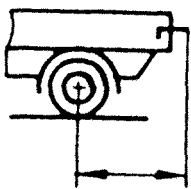
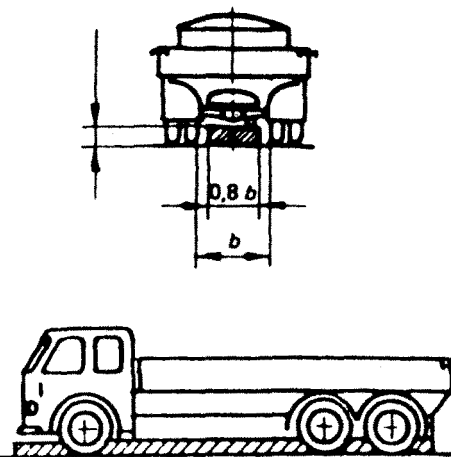
FIG. 1 LONGITUDINAL MEDIAN PLANE

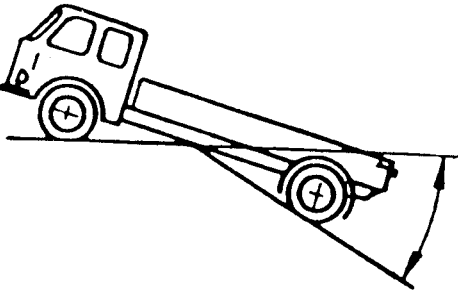

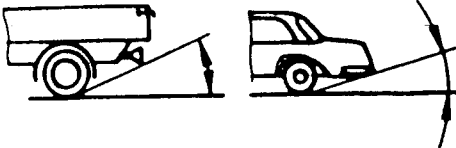
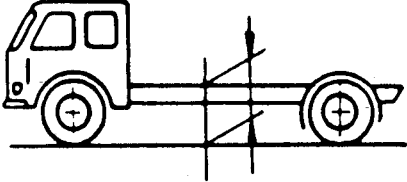
5 TERMS AND DEFINITIONS OF MOTOR VEHICLE

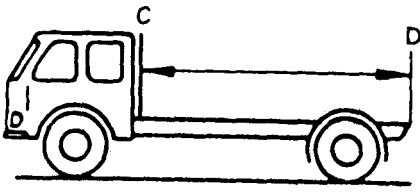
Clause	Term	Definition	Drawing
5.1	Vehicle Length	<i>See 5.1.1.</i>	
5.1.1	<i>Motor Vehicle Length</i>	<p>The distance between two vertical planes perpendicular to the longitudinal median plane (of the vehicle) (<i>see 4</i>) and touching the front and rear of the vehicle respectively. When measuring the vehicle length, following devices must not be taken into account:</p> <ul style="list-style-type: none"> a) Wiper and washer devices; b) Front or rear marking plates; c) Customs sealing devices and their protection; d) Devices for securing the tarpaulin and their protection; e) Lighting equipment; f) Rear view mirrors; g) Rear space watching aids; h) Air-intake pipes; j) Length stops for demountable bodies; k) Access steps; m) Ram rubber; n) Lifting platforms, access ramps and similar equipments in running order, not exceeding 200 mm provided that the loading capacity of the vehicle is not increased; 	

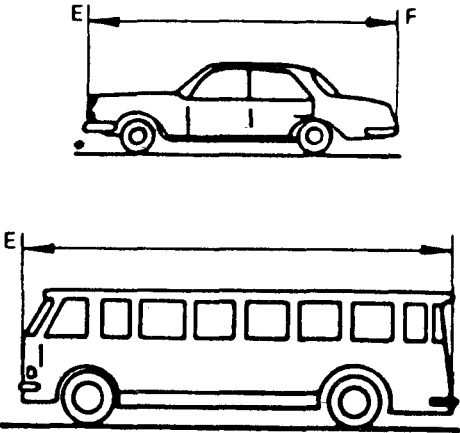
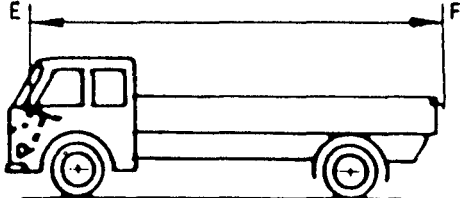
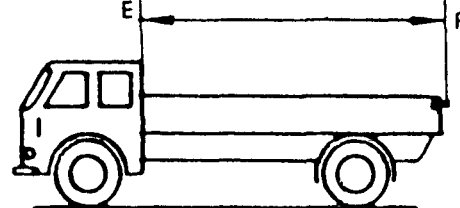
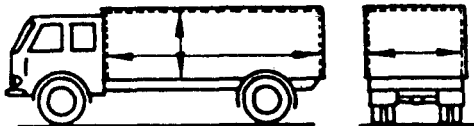
Clause	Term	Definition	Drawing
		<p>p) Coupling devices for motor vehicles;</p> <p>q) Rear view mirror—attachment fixtures;</p> <p>r) Bumper guard or bull bar not exceeding 200 mm;</p> <p>s) Wind spoiler; and</p> <p>t) Exhaust pipe.</p>	
5.2	Vehicle Width	<p>The distance between two planes parallel to the longitudinal median plane (of the vehicle) (<i>see 4</i>) and touching the vehicle on either side of the said plane.</p> <p>When measuring the vehicle width, following devices must not be taken into account:</p> <p>a) Customs sealing devices and their protection;</p> <p>b) Devices for securing the tarpaulin and their protection;</p> <p>c) Tyre failure tell-tale devices;</p> <p>d) For vehicles of categories M2 and M3, access ramps in running order, lifting platforms and similar equipment in running order provided that they do not exceed 10 mm from the side of the vehicle and the corners of the ramps facing forwards or rearwards are rounded to a radius of not less than 5 mm; the edges must be rounded to the radius of not less than 2.5 mm;</p> <p>e) Rear view mirrors;</p> <p>f) Tyre pressure indicator;</p> <p>g) Retractable steps;</p> <p>h) The deflected part of the tyre walls immediately above the point of contact with the ground;</p> <p>j) Side marker lamps;</p> <p>k) Direction indicator lamps;</p> <p>m) Position lights;</p> <p>n) Flexible mudguards; and</p> <p>p) Snow chains.</p> <p>NOTE — All parts — other than above — of the vehicle, including and lateral projections of fixed parts (wheel hubs, door-handles, fenders, etc) are contained between these two planes.</p>	

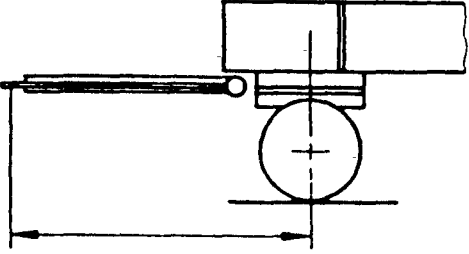
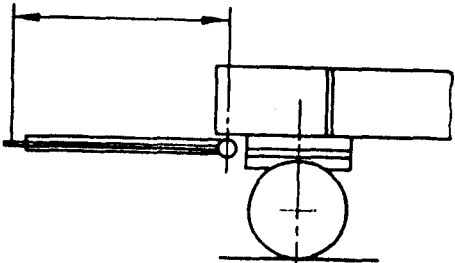
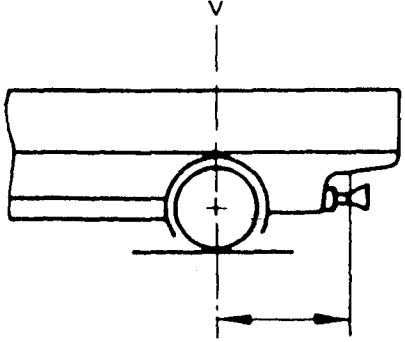
Clause	Term	Definition	Drawing
5.3	Vehicle Height (Unladen)	<p>The distance between the supporting surface and of a horizontal plane touching the top most part of a vehicle.</p> <p>NOTES</p> <p>1 Fixed parts of the vehicle are contained between these two planes except the following:</p> <ul style="list-style-type: none"> a) Aerials; b) Pentograph in their elevated position; c) Roof luggage carrier; d) Special purpose lamps; and e) Spoiler. <p>For vehicles with an axle-lift device, the effect of this device must be taken into account.</p> <p>2 The vehicle is in operating order and unladen.</p>	
5.4	Wheel Base	See 5.4.1	
5.4.1	<i>Motor Vehicle or Trailer Wheel Base</i>	<p>The distance between the perpendicular lines constructed to the longitudinal median plane (of the vehicle) (see 4) from the previously defined points A or B corresponding to two consecutive wheels situated on the same side of the vehicle.</p> <p>NOTE — For vehicles with three or more axles, the wheel bases between consecutive wheels are indicated, going from the foremost to the rearmost wheel; the total wheel bases for right or for left is the sum of these distances.</p>	

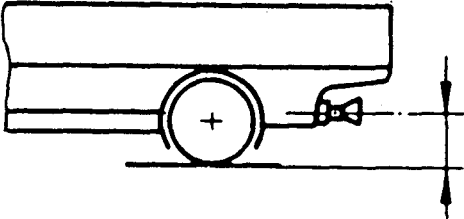
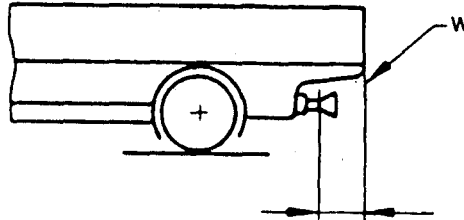
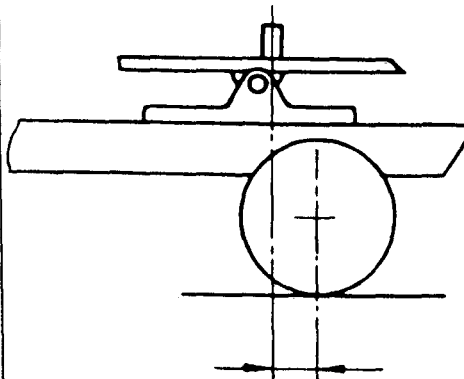
Clause	Term	Definition	Drawing
5.5	Track	<p>The track corresponding to a real or imaginary axle is the sum of the two distance AH and BH in relation to the two wheels connected to this axle. AH and BH being the distances from points A and B defined in 4 to the longitudinal median plane (of the vehicle).</p> <p>NOTE — In case of dual wheels, see Note 2 of 4.</p>	
5.6	Front Over Hang	<p>The distance between the vertical plane passing through the centres of the front wheels and the foremost point of the vehicle, taking into consideration lashing hooks, registration number plate etc. and any parts rigidly attached to the vehicle.</p>	
5.7	Rear Over Hang	<p>The distance between the vertical plane passing through the centres of the rearmost wheels and the rearmost point of the vehicle, taking into consideration towing attachment, registration number plate, etc and any parts rigidly attached to the vehicle.</p>	
5.8	Minimum Ground Clearance	<p>The distance between the ground and the lowest point of the centre part of the vehicle. The centre part is that part contained between two planes parallel to and equidistant from the longitudinal median plane (of the vehicle) (see 4) and separated by a distance which is 80 percent of the least distance between points on the inner edges of the wheels on any one axle.</p> <p>NOTE — This measurement has to be done on fully laden vehicle to the maximum authorized GVW.</p>	

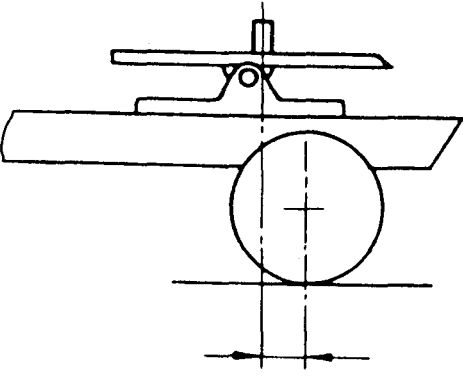
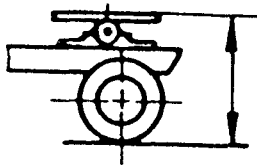
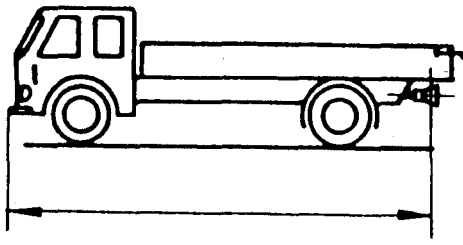
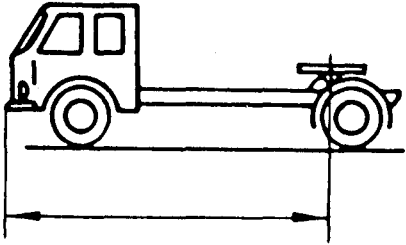
Clause	Term	Definition	Drawing
5.9	Ramp Angle	The minimum acute angle measured between two planes, perpendicular to the longitudinal median plane of the vehicle, tangential, respectively, to the tyres of the front and the rear wheels, static loaded, and intersecting at a line touching the rigid lower part of the vehicle, outside these wheels. This angle defines the largest ramp over which the vehicle can move. When measuring the ramp angle, no account is taken of under-run protective devices.	 <p>The diagram shows a truck on a ramp. Two lines are drawn perpendicular to the longitudinal median plane of the truck. One line is tangent to the front wheel, and the other is tangent to the rear wheel. The angle between these two lines is indicated by a double-headed arrow, representing the ramp angle.</p>
5.10	Approach Angle	The greatest angle between the horizontal plane and planes tangential to the static loaded front wheel tyres, such that no point of the vehicle ahead of the front axle lies below these planes and that no part rigidly attached to the vehicle with the exception of any steps, lies below these planes. When measuring the approach angle, no account is taken of under-run protective devices.	 <p>The diagram shows two vehicles on a horizontal surface. For the truck on the left, a line is drawn tangent to the front wheel, and the angle between this line and the horizontal ground is marked with a double-headed arrow. A similar measurement is shown for a car on the right.</p>
5.11	Departure Angle	The greatest angle between the horizontal plane and planes tangential to the static loaded rear wheel tyres, such that no point of the vehicle behind the axle lies below these planes and that no part rigidly attached to the vehicle, lies below these planes. When measuring the departure angle, no account is taken of under-run protective devices.	 <p>The diagram shows two vehicles on a horizontal surface. For the truck on the left, a line is drawn tangent to the rear wheel, and the angle between this line and the horizontal ground is marked with a double-headed arrow. A similar measurement is shown for a car on the right.</p>
5.12	Height of Chassis Above Ground (Commercial Vehicles)	<p>The distance from the ground to the horizontal line perpendicular to the longitudinal median plane (of the vehicle) (see 4) and touching the upper surface of the chassis measured at the middle of the wheel base in unladen condition.</p> <p>NOTES</p> <p>1 In the case of vehicles with more than two axles, the distance is measured at the outermost axles (excluding lifting axles).</p> <p>2 The height of the chassis above the supporting surface should be determined not only with the vehicle loaded to its maximum authorized gross vehicle weight (GVW) but also with the vehicle unladen.</p>	 <p>The diagram shows a truck on a horizontal surface. A vertical line is drawn from the ground to the upper surface of the chassis, passing through the middle of the wheel base. A horizontal line is drawn from this point to the longitudinal median plane of the vehicle, perpendicular to it.</p>

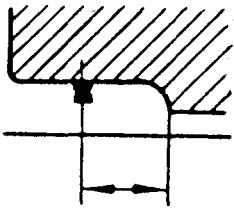
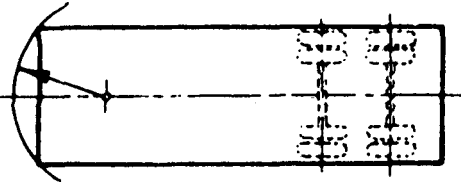
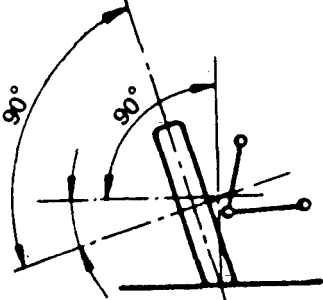
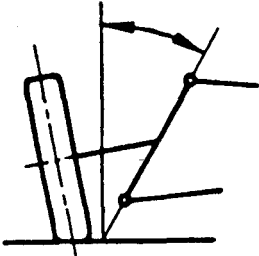
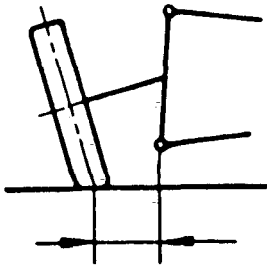
Clause	Term	Definition	Drawing
5.13	Maximum Usable Length of Chassis Behind Cab (Vehicle with Cab)	<p>The distance between two vertical planes <i>C</i> and <i>D</i> perpendicular to the longitudinal median plane (of the vehicle) (<i>see</i> 4):</p> <ol style="list-style-type: none"> Plane <i>C</i> is the foremost plane which can be used for the body work, and Plane <i>D</i> touches the rear end of the chassis. 	
5.14	Body Work Length	<p>The distance between two planes <i>E</i> and <i>F</i> perpendicular to the longitudinal median plane (of the vehicle) (<i>see</i> 4) defined as in 5.14.1 to 5.14.3. When measuring the body work length, following devices must not be taken into account:</p> <ol style="list-style-type: none"> The loading area forward of the rearmost point of the cabin, Wiper and washer devices, Front or rear marking plates, Customs sealing devices and their protection, Devices for securing the tarpaulin and their protection, Lighting equipment, Rear view mirrors, Rear space watching aids, Air-intake pipes, Length stops for demountable bodies, Access steps, Ram rubber, Lifting platform, access ramps and similar equipment in running order, not exceeding 200 mm, provided that the loading capacity of the vehicle is not increased, Coupling devices for motor vehicles, Protruding cooling units and other auxiliaries situated forward of the loading area. <p>NOTE — The body work length does not include lashing hooks, towing attachments of trailers, rear registration number plates, bumpers, etc. unless these are an integral part of the body.</p>	

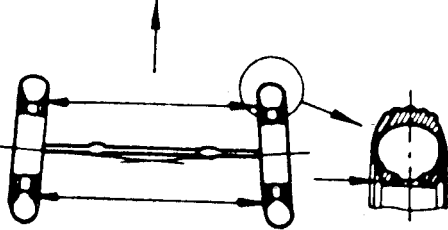
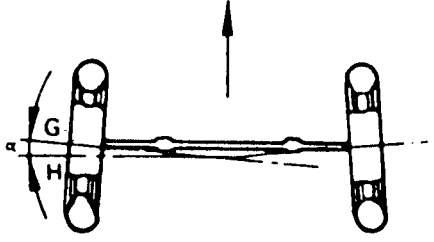
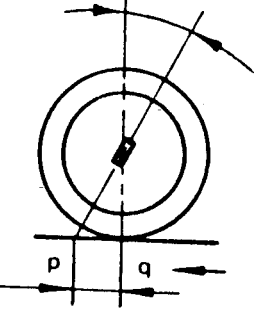
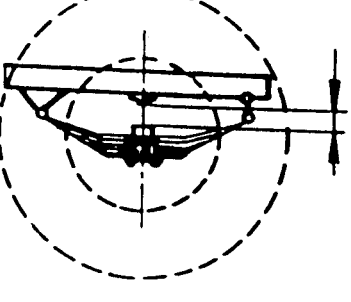
Clause	Term	Definition	Drawing
5.14.1	<i>Passenger Car and Chassis Without Cab and Without Any Enclosure for the Engine or Other Components which are Intended to Form an External Part of the Vehicle</i>	a) Plane <i>E</i> passes through the foremost part of the body, and b) Plane <i>F</i> passes through the rearmost part of the body.	
5.14.2	<i>Chassis Without Cab but with an Enclosure for the Engine Intended to Form an External Part of the Vehicle</i>	a) Plane <i>E</i> touches the back of the foremost predominating surface of the dash panel in the area directly ahead of the driving position of the vehicle, disregarding flanges and localized depressions; and b) Plane <i>F</i> is defined as in 5.14.1.	
5.14.3	<i>Chassis Supplied Complete with Driver's Cab</i>	a) Plane <i>E</i> passes through the foremost part of the body which is behind the driver's cab; b) Plane <i>F</i> is defined as in 5.14.1.	
5.15	Maximum Internal Dimensions of the Body (Commercial Vehicles)	<p>The interior length, width and height of the body without taking into account internal projections (wheel boxes, ribs, hooks, etc).</p> <p>NOTES</p> <p>1 However, the presence of internal projections should be noted.</p> <p>2 If the walls or roof are curved, each dimension is measured between the planes (vertical or horizontal, depending on the case) tangential to the apices of the curved surfaces concerned, the dimensions being measured inside the body.</p>	

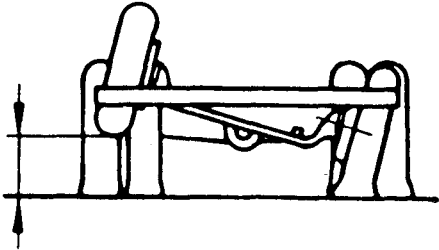
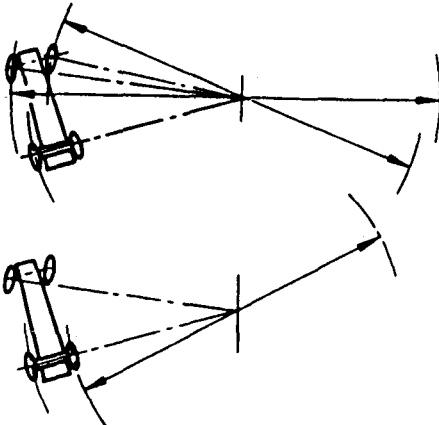
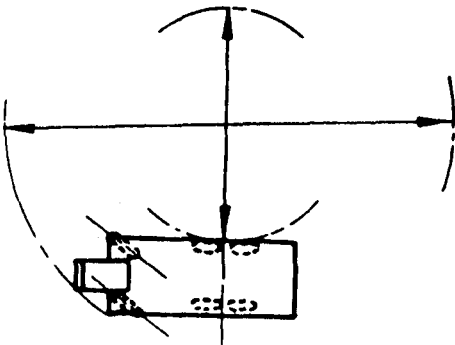
Clause	Term	Definition	Drawing
5.16	Drawgear Length	The distance between axis of the drawbar eye (in a vertical position) and the vertical plane passing through the axes of the front wheels of the trailer.	
5.17	Drawbar Length	The distance between the draw bar eye (in a vertical position) and the vertical plane passing through the axis of the pin fixing the drawbar to the trailer [plane perpendicular to the longitudinal median plane (<i>see 4</i>) of the trailer].	
5.18	Position of Towing Attachment	This attachment assumes as its plane of symmetry the longitudinal median plane (of the vehicle) (<i>see 4</i>). Its position is defined by the dimensions defined in 5.18.1 to 5.18.3.	
5.18.1	<i>Overhang of Attachment</i>	<p>The distance from the attachment to the vertical plane perpendicular to longitudinal median plane (<i>see 4</i>) and passing through the axis of the rearmost axle (plane <i>V</i>), that is the distance to plane <i>V</i>:</p> <ol style="list-style-type: none"> For a ball, from the centre of the ball; For a jaw, from the vertical plane passing through the axis of the pin and parallel to plane <i>V</i>; and For a hook, from the centre of the meridian section of the corresponding toroidal ring, the axis of the section being vertical. 	

Clause	Term	Definition	Drawing
5.18.2	<i>Height of Attachment</i>	<p>The distance from the attachment to the supporting plane that is the distance from the supporting plane:</p> <ul style="list-style-type: none"> a) For a ball, to the centre of the ball; b) For a jaw, to the horizontal plane equidistant from the two inner faces of the shackle with the pin vertical; and c) For a hook, to the centre of the meridian section of the corresponding toroidal ring, the axis of this section being vertical. 	 <p>The drawing shows a side view of a towing attachment. A horizontal line represents the supporting plane. A vertical dimension line with arrows at both ends indicates the distance from this plane to the center of a circular ball, which is marked with a '+' sign.</p>
5.18.3	<i>Distance Towing Attachment in Front of Rear of Vehicle</i>	<p>The distance from the attachment as defined in 5.18.1(a), (b) or (c) to the vertical plane <i>W</i> perpendicular to the longitudinal median plane (<i>see</i> 4) and passing through the rear of the body.</p> <p>NOTE — In determining the position of plane <i>W</i>, minor projections, such as, tail-gate hinges, latches etc are disregarded.</p>	 <p>The drawing shows a side view of a towing attachment. A vertical line labeled 'W' represents a vertical plane. A horizontal dimension line with arrows at both ends indicates the distance from the center of the ball (marked with a '+') to this plane.</p>
5.19	Fifth Wheel Lead	<p><i>See</i> 5.19.1 to 5.19.2.</p> <p>NOTE — For towing vehicles with two or more rear axles, the distance is measured to the vertical plane passing through the centre line of the rearmost wheel.</p>	
5.19.1	<i>Fifth Wheel Lead for Calculation of Length</i>	<p>The distance from the vertical axis passing through the centre of the seating on the towing vehicle for the fifth wheel kingpin to the vertical plane passing through the axis of the rear wheel of the towing vehicle, perpendicular to the longitudinal median plane (of the vehicle) (<i>see</i> 4).</p>	 <p>The drawing shows a top-down view of a fifth wheel assembly. A vertical dashed line represents the axis of the kingpin. A horizontal dimension line with arrows at both ends indicates the distance from this axis to a vertical plane that passes through the center of the rear wheel of the towing vehicle.</p>

Clause	Term	Definition	Drawing
5.19.2	<i>Fifth Wheel Lead for Calculation of Load Distribution</i>	The distance from the horizontal axis of the pivot of the fifth wheel on the towing vehicle to the vertical plane passing through the axis of the rear wheel of the towing vehicle, perpendicular to the longitudinal median plane (of the vehicle) (see 4).	
5.20	Height of Coupling Face	The maximum distance from the centre of the seating of the fifth wheel kingpin to the bearing plane. This point is situated in the horizontal plane touching the upper part of the seat.	
5.21	Distance Between Towing Device and Front End of Towing Vehicle	<i>See 5.21.1 and 5.21.2.</i>	
5.21.1	<i>Distance Between Jaw and Front End of Towing Vehicle</i>	The distance from the axis of the pin in the jaw or centre of the ball or, for a hook, from the centre of the meridian section of the corresponding toroidal ring, to a vertical plane, perpendicular to the longitudinal median plane (of the vehicle) (see 4) and touching the front part of the towing vehicle.	
5.21.2	<i>Distance Between Kingpin and Front End of Towing Vehicle</i>	The distance from the vertical axis passing through the centre of the kingpin seating on the towing vehicle to the vertical plane, perpendicular to the longitudinal median plane (of the vehicle) (see 4) and touching the front end of the towing vehicle.	

Clause	Term	Definition	Drawing
5.22	Rear Tractor Clearance Radius of Semi-trailer	The distance from the axis of the kingpin to the surface of the cylindrical part of the gooseneck of other downward projection.	
5.23	Front Fitting Radius of Semi-trailer	The distance from the axis of the kingpin to the farthest point of the front part of the semi-trailer from this axis.	
5.24	Camber Angle	<p>The acute angle formed by a vertical line and the midplane of the wheel. The angle is positive when the wheel leans out at the top.</p> <p>NOTE — This angle is measured in the unladen condition of the vehicle.</p>	
5.25	Kingpin Inclination	<p>The projection on to a plane perpendicular to the longitudinal median plane (of the vehicle) (<i>see 4</i>) of the acute angle, formed by the vertical and the real or imaginary swiveling axis of the stub axle.</p> <p>NOTE — This angle is measured in the unladen condition of the vehicle.</p>	
5.26	Kingpin Offset	The distance from the extension of the swiveling axis of the stub axle onto the supporting surface to the extension onto the same plane of the mid-plane of the wheel. The kingpin offset shown on the drawing is positive.	

Clause	Term	Definition	Drawing
5.27	Toe-in	See 5.27.1 and 5.27.2.	
5.27.1	<i>Toe-in Length</i>	<p>The length defined as follows: The ends of the horizontal diameters of the interior contours of the rims corresponding to the same axle are the apices of an isosceles trapezium. The difference between the length of the rear base and that of the forward base of the trapezium is the toe-in, the difference being positive when the wheels are closer together in front than behind, and negative in the contrary case.</p>	
5.27.2	<i>Toe-in Angle</i>	<p>The angle formed by the horizontal diameter of the wheel and the longitudinal median plane (of the vehicle) (see 4) or the acute angle formed by the vertical plane <i>G</i> passing through the axis of the axle-pin and a vertical plane <i>H</i> perpendicular to the longitudinal median plane (of the vehicle).</p>	
5.28	Castor	<p>The distance between two points <i>p</i> and <i>q</i>: this distance is the projection on to a plane parallel to the longitudinal median plane (of the vehicle) (see 4) of the acute angle formed by the vertical and the real or the imaginary swiveling axis of the stub axle. It is positive when <i>p</i> is ahead of <i>q</i> in the direction of normal travel.</p>	
5.29	Vertical Clearance (Buffer Clearance)	<p>The vertical displacement of a wheel in relation to the suspended part of the vehicle from the position corresponding of the maximum authorized GVW load to the position from which any additional vertical travel is impossible.</p>	

Clause	Term	Definition	Drawing
5.30	Lift	<p>The height to which a wheel may be lifted without any other wheels leaving their supporting surface.</p>	
5.31	Turning Circles	<p>The diameters of the circles circumscribing the extensions on the supporting plane of mid planes of the steered wheels (the steering wheel being turned to the full lock).</p> <p>NOTES</p> <p>1 The smaller diameter of the circle circumscribing the extension on the supporting plane of the mid-plane of an inner non-steered wheel is also of practical interest.</p> <p>2 Each vehicle has left-hand and right-hand turning circles.</p>	
5.32	Turning Clearance Circles	<p>The turning clearance circles (the steering wheel being turned to full lock) are:</p> <p>a) The diameter of the smallest circle enclosing the projections onto the supporting plane of all points of the vehicle.</p> <p>b) The diameter of the largest circle beyond which are located the projections onto the supporting plane of all the points of the vehicle.</p> <p>NOTE — Each vehicle has right-hand and left hand turning clearance circles.</p>	

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Automotive Basic Standards Sectional Committee, TED 1

<i>Organization</i>	<i>Representative(s)</i>
Automotive Research Association of India, Pune	SHRI B. BHANOT (<i>Chairman</i>) SHRIMATI RASHMI URDHWARSHI (<i>Alternate I</i>) SHRI S. S. SANDHU (<i>Alternate II</i>) SHRI U. A. KUKLARNI (<i>Alternate III</i>)
Ashok Leyland Ltd, Chennai	SHRI M. SUBRAMANIAN (<i>Alternate</i>)
Association of State Road Transport Undertakings, New Delhi	DR M. KOTEESWARAN SHRI A. S. LAKRA (<i>Alternate</i>)
Automotive Component Manufacturers Association of India, New Delhi	SHRI VISHNU MATHUR SHRI K. M. D. NAMBOODRIPAD (<i>Alternate</i>)
Bajaj Auto Ltd, Pune	SHRI T. M. BALARAMAN SHRI V. M. MANEL (<i>Alternate</i>)
Bajaj Tempo Ltd, Pune	SHRI VIVEK ADYANTHAYA SHRI A. S. YEWALE (<i>Alternate</i>)
Central Institute of Road Transport, Pune	SHRI N. R. KACHARE SHRI P. S. MUNOLI (<i>Alternate</i>)
Controllerate of Quality Assurance (ICV), Medak District	SHRI D. CHAKRAM SHRI N. M. KANDASWAMY (<i>Alternate</i>)
Daewoo Motors India Ltd, Surajpur	SHRI R. GOVINDAPPA SHRI A. BATRA (<i>Alternate</i>)
Daimler Chrysler India, Pune	SHRI SANJEEV MANDPE SHRI MUKESH BHAT (<i>Alternate</i>)
Eicher Motor Ltd, Indore	SHRI SHARAD SAXENA SHRI CHARANJIV SINGH (<i>Alternate</i>)
Hindustan Motors Ltd, Distt Hooghly	SHRI U. K. KJNI SHRI D. B. RAY (<i>Alternate</i>)
HMT Ltd, Pinjore	SHRI ALOK NIGAM SHRI P. K. AGGARWAL (<i>Alternate</i>)
Indian Institute of Petroleum, Dehradun	SHRI A. K. JAIN SHRI A. K. AIGAL (<i>Alternate</i>)
Kinetic Engineering Ltd, Pune	SHRI R.V. GOVIND
LML Ltd, Kanpur	SHRI P. S. ASHOK SHRI DINESH KUMAR (<i>Alternate</i>)
Mahindra & Mahindra Ltd, Nashik	SHRI H. N. SUBBARAO SHRI RAGHUNATH SHENDE (<i>Alternate</i>)
Maruti Udyog Ltd, Gurgaon	SHRI I. V. RAO SHRI P. PURSHOTHAM (<i>Alternate</i>)
Ministry of Heavy Industries & Public Enterprises, New Delhi	SHRI V. C. MATHUR SHRI S. K. BHARJ (<i>Alternate</i>)
Ministry of Road Transport & Highways, New Delhi	DIRECTOR
Ordnance Factory Board, Kolkata	SHRI M. L. SUD SHRI Y. SOMRA (<i>Alternate</i>)
Premier Automobiles Ltd, Mumbai	SHRI G. Y. BHATT SHRI S. N. SRINIVASAN (<i>Alternate</i>)
Society of Indian Automobile Manufacturers, New Delhi	SHRI RAJAT NANDI SHRI SUMIT SHARMA (<i>Alternate</i>)
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Toyota Kirloskar Motor Pvt Ltd, Bangalore (Rural) Distt	SHRI K. E. TAKAVALE SHRI S. SAKTHIVELAN (<i>Alternate</i>)
Transport Commissioner's Office, Mumbai	SHRI S. B. SAHASRABUDHE SHRI S. N. SASANE (<i>Alternate</i>)

<i>Organization</i>	<i>Representative(s)</i>
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Yamaha Motor Pvt Ltd, Faridabad	SHRI S. C. YONEJAWA SHRI B. SARKAR (<i>Alternate</i>)
BIS Directorate General	SHRI K. K. VASHISTHA, Director & Head (TED) [Representing Director General (<i>Ex-officio</i>)]
	<i>Member Secretary</i> SHRI V. ARUMUGAM Joint Director (TED), BIS

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This Indian Standard has been developed from Doc: No. TED 1 (309).

Amendments Issued Since Publication

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002

Telephones: 2323 0131, 2323 3375, 2323 9402

website : www.bis.org.in

Regional Offices:

	Telephones
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{ 2323 7617 2323 3841
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