UDC 629·113·071·1 : 001·4

Indian Standard (Reaffirmed 1995)

TERMS AND DEFINITIONS RELATING TO DIMENSIONS OF ROAD VEHICLES

Automotive Vehicles Sectional Committee, EDC 38 [Ref : Doc : EDC 38 (2320)]

1. Scope — Defines 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 motor vehicles defined in ' Indian Standard Classification of road vehicles and related terms and definitions ' (*under preparation*).

1.3 This standard does not cover road vehicles such as motorcycles, 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. General — 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 authorized total weight, the load being distributed according to the manufacturer's instructions (*see* IS : 9211-1979 Denominations and definitions of weights of road vehicles);

c) the tyres are inflated to the pressure corresponding to the maximum authorized total weight of the vehicle;

d) the vehicle is stationary, and its wheels and articulated elements are in positions corresponding to movements in a straight line;

e) the vehicle is new from the factory and normally equipped;

f) all wheels of the vehicle are resting on the ground; and

g) the expression ' mid-plane of the wheel ', that occurs in a number of definitions, designates the planes equidistant from the inner edges of the rim.

3. 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* **2** (g)] following a straight line △ 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 both ends of the same real or imaginary axle.

Adopted 27 February 1980

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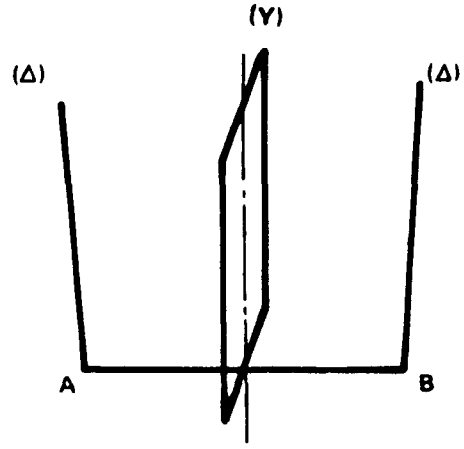
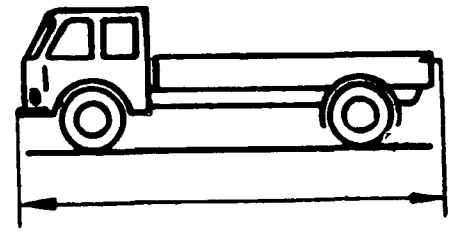
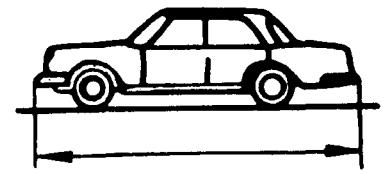


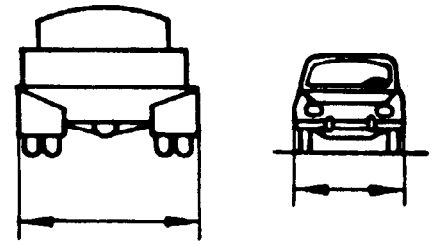
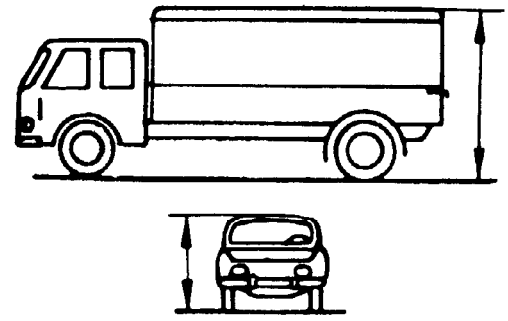
FIG. 1 LONGITUDINAL MEDIAN PLANE

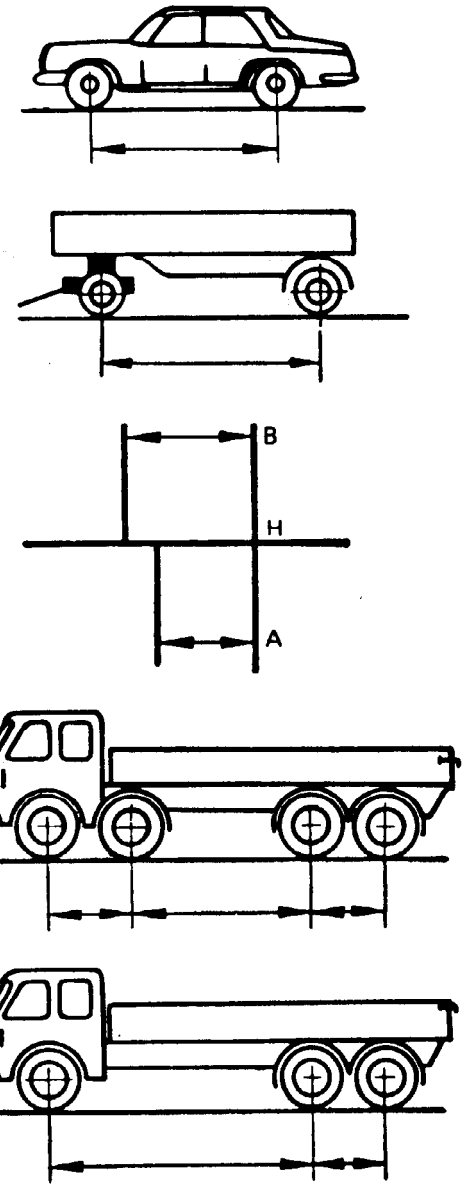
Note 1 — The longitudinal median plane (of the vehicle) is also called the ' longitudinal plane of symmetry ' or ' Zero *Y* plane ' [*see* Indian Standard three-dimensional reference system and fiducial marks (*under preparation*)].

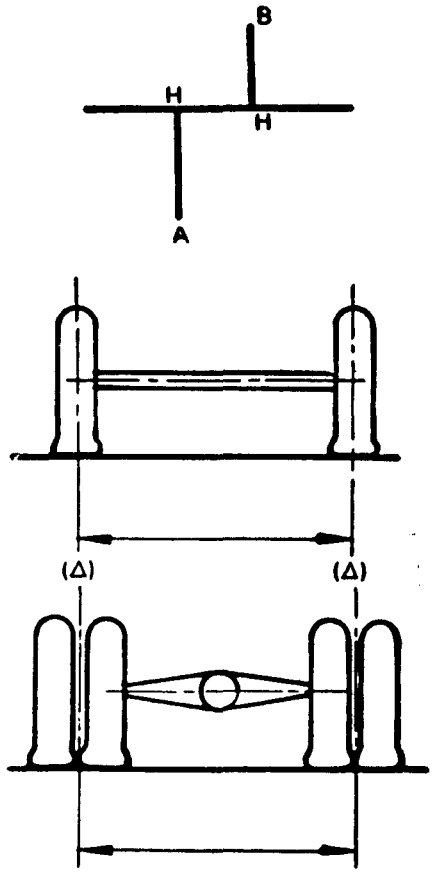
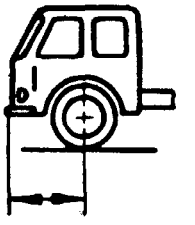
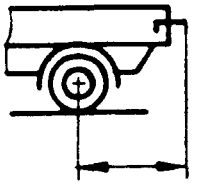
Note 2 — In the case of dual wheels, the mid-plane of the dual wheels is equidistant from the inner edge of one wheel and the outer edge of the other. The straight line △ is, in this particular case, the intersection of the mid-plane of the dual wheels and the vertical plane passing through the axis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

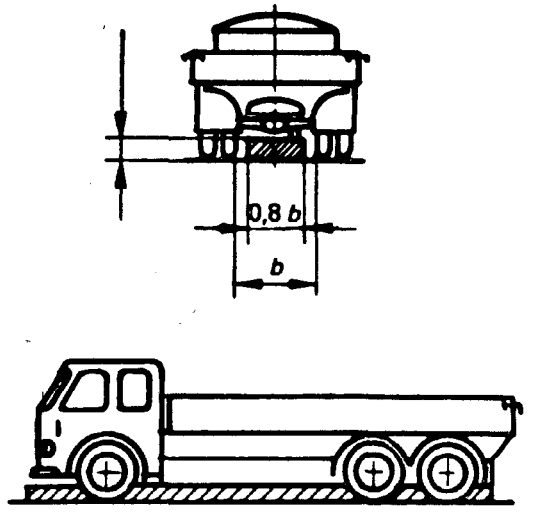
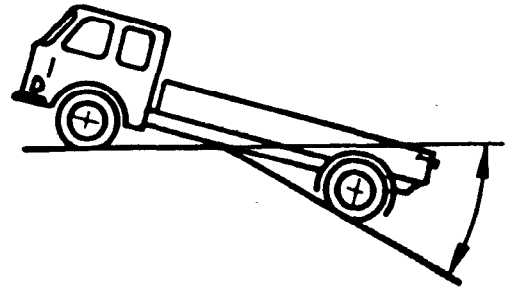
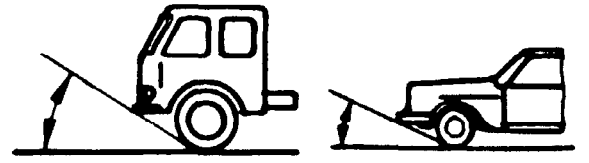
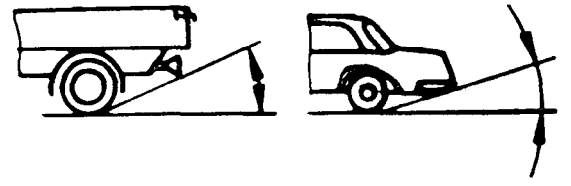
4. TERMS AND DEFINITIONS OF MOTOR VEHICLES

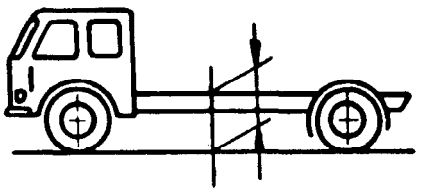
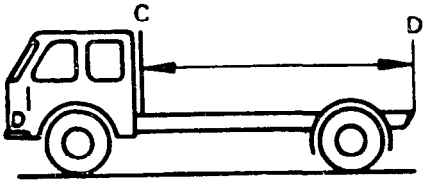
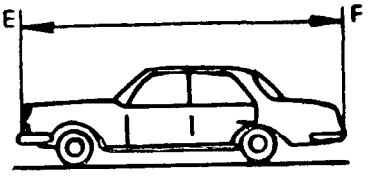
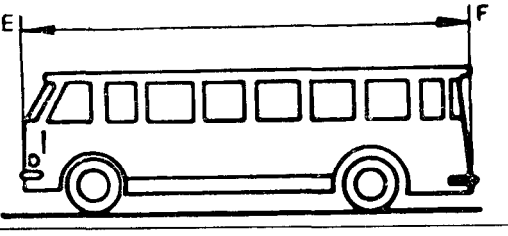
Clause	Term	Definition	Drawing
4.1	Vehicle Length	*see* **4.1.1**	
4.1.1	Motor vehicle length	The distance between two vertical planes perpendicular to the longitudinal median plane (of the vehicle) (*see* **3**) and touching the front and rear of the vehicle respectively. **Note** — All parts of the vehicle, including any parts projecting from front or rear (towing hooks, bumpers, etc) are contained between these two planes.	 

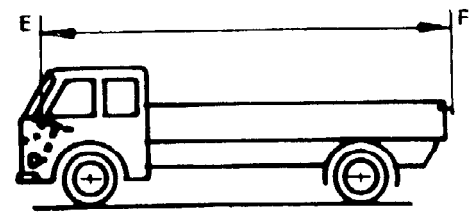
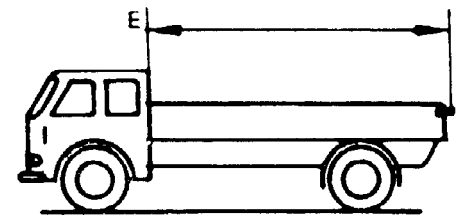
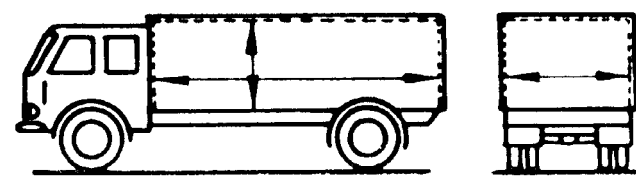
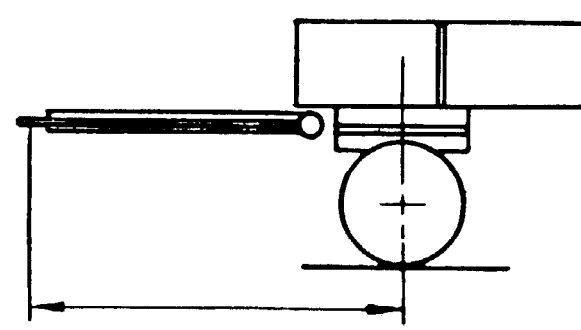
Clause	Term	Definition	Drawing
4.2	Vehicle Width	The distance between two planes parallel to the longitudinal median plane (of the vehicle) (*see* **3**) and touching the vehicle on either side of the said plane. **Note** — All parts of the vehicle, including any lateral projections of fixed parts (wheel hubs, door-handles, fenders, etc) are contained between these two planes, except the driving mirror, side marker lamps, tyre pressure indicators, direction indicator lamps, position lights, customs seals, flexible mudguards, retractable steps, snow chains and the deflected part of the tyre walls immediately above the point of contact with the ground.	
4.3	Vehicle Height (unladen)	The distance between the supporting surface and a horizontal plane touching the topmost part of a vehicle. **Note 1** — All fixed parts of the vehicle are contained between these two planes. **Note 2** — The vehicle is in operating order and unladen.	

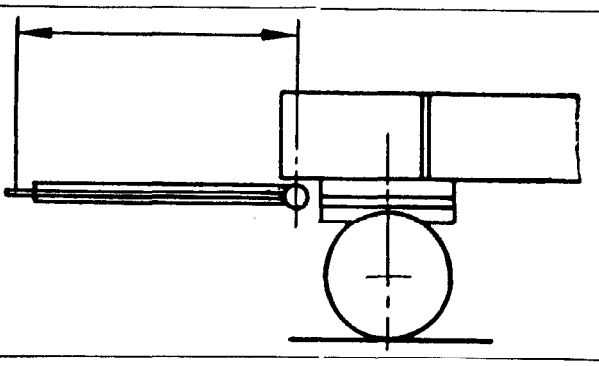
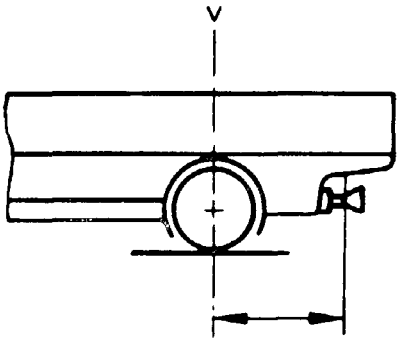
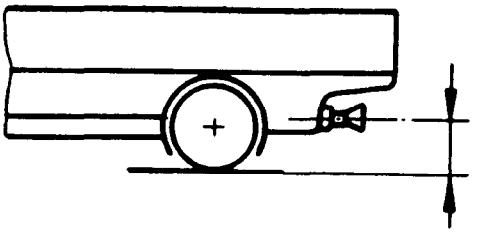
Clause	Term	Definition	Drawing
4.4	Wheel Base	*See* 4.4.1	
4.4.1	Motor vehicle wheel base	The distance between the perpendicular lines constructed to the longitudinal median plane (of the vehicle) (*see* **3**) from the previously defined points A or B corresponding to two consecutive wheels situated on the same side of the vehicle. **Note 1** — If the values of right and left wheel bases are different, both dimensions shall be stated separated by a dash, the first corresponding to the left wheels. **Note 2** — 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.	

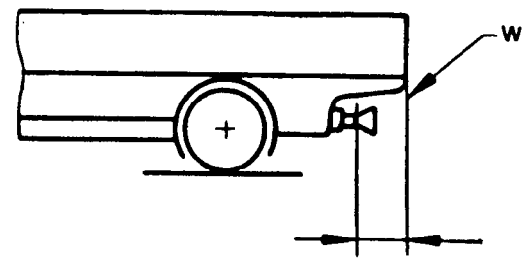
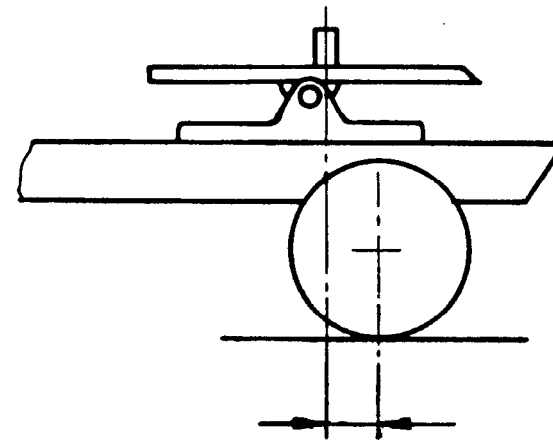
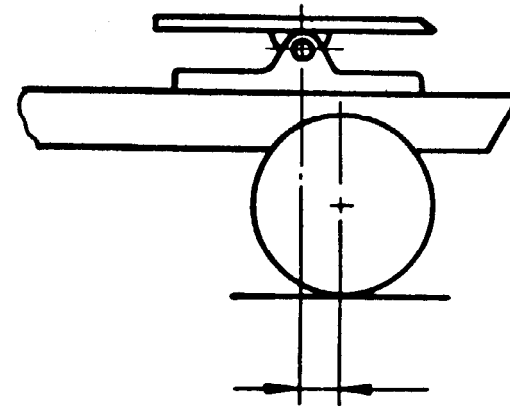
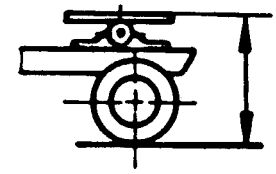
Clause	Term	Definition	Drawing
4.5	Track	The track corresponding to a real or imaginary axle is the sum of the two distances *AH* and *BH* in relation to the two wheels connected to this axle, *AH* and *BH* being the distances from points *A* and *B* defined in **3** to the longitudinal median plane (of the vehicle). **Note 1** — *Practical brief definition* : In the case of two single wheels corresponding to the same real or imaginary axle, the track is represented by the distance between the axes of the traces left by the wheels on the supporting surface. **Note 2** — *Case of dual wheels See* Note 2 of **3**.	
4.6	Front Overhang	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.	
4.7	Rear Overhang	The distance between the vertical plane passing through the centres of the rearmost wheels and the rearmost point of the vehicle, taking into consideration the towing attachment, registration number plate, etc, and any parts rigidly attached to the vehicle.	

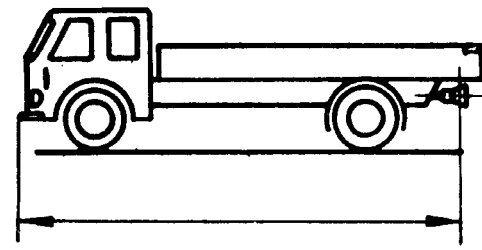
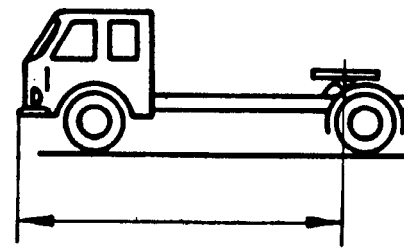
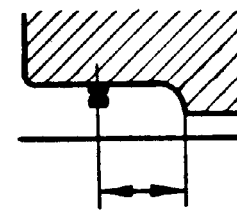
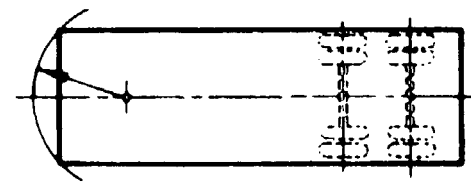
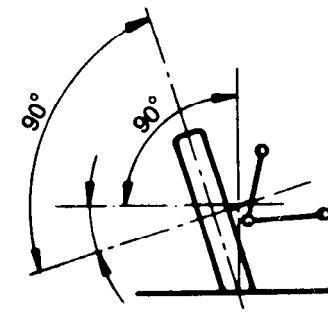
Clause	Term	Definition	Drawing
4.8	Ground Clearance	The distance between the ground and the lowest point of the centre part of the vehicle. The centre part is that part contained between two planes parallel to and equidistant from the longitudinal median plane (of the vehicle) (*see* 3) and separated by a distance which is 80 percent of the least distance between points on the inner edges of the wheels on any one axle.	
4.9	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 lower part of the vehicle, outside these wheels. This angle defines the largest ramp over which the vehicle can move.	
4.10	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 axle lies below these planes and that no part rigidly attached to the vehicle lies below these planes.	
4.11	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.	

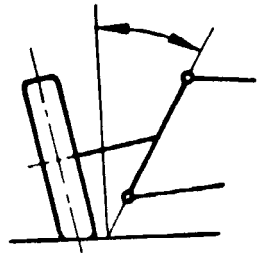
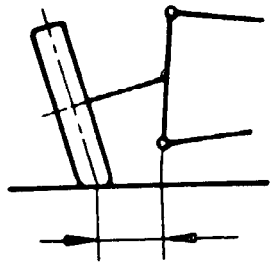
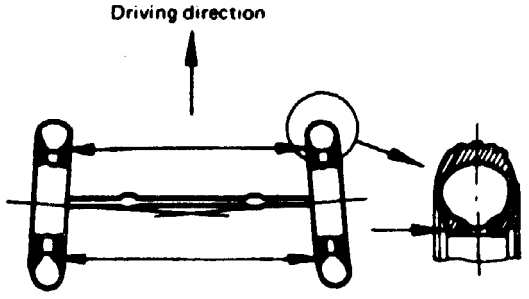
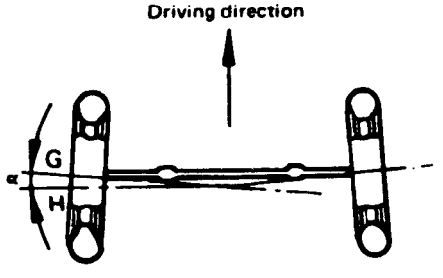
Clause	Term	Definition	Drawing
4.12	Height of Chassis Above Ground (Commercial Vehicles)	The distance from the ground to the horizontal line perpendicular to the longitudinal median plane (of the vehicle) (*see* **3**) and touching the upper surface of the chassis measured at the middle of wheel base in unladen condition. **Note 1** — In the case of vehicles with more than two axles, the distance is measured at the outermost axles (excluding lifting axles). **Note 2** — The height of the chassis above the supporting surface should be determined not only with the vehicle loaded to its maximum permissible weight, but also with the vehicle unladen.	
4.13	Maximum Usable Length of Chassis Behind Cab (Vehicle With Cab)	The distance between two vertical planes *C* and *D* perpendicular to the longitudinal median plane (of the vehicle) (*see* **3**): —plane *C* is the foremost plane which can be used for the bodywork; —plane *D* touches the rear end of the chassis.	
4.14	Bodywork Length	The distance between two planes *E* and *F* perpendicular to the longitudinal median plane (of the vehicle) (*see* **3**) defined as in **4.14.1** to **4.14.3**. **Note** — The bodywork 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.	
4.14.1	Passenger cars 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	a) plane *E* passes through the foremost part of the body; b) plane *F* passes through the rearmost part of the body.	 

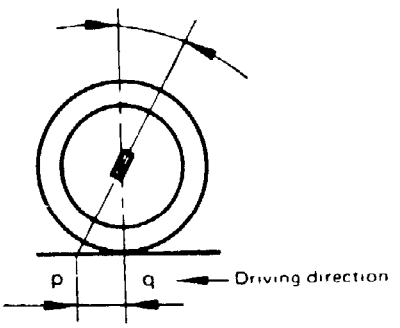
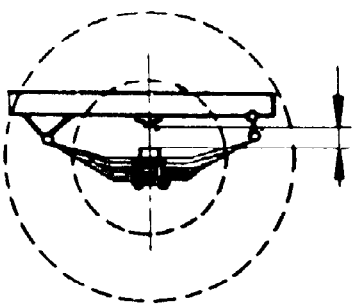
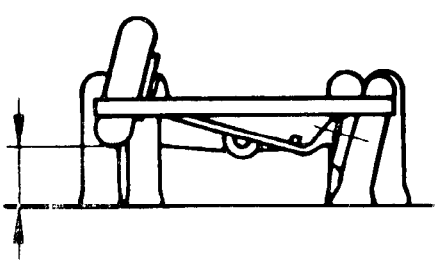
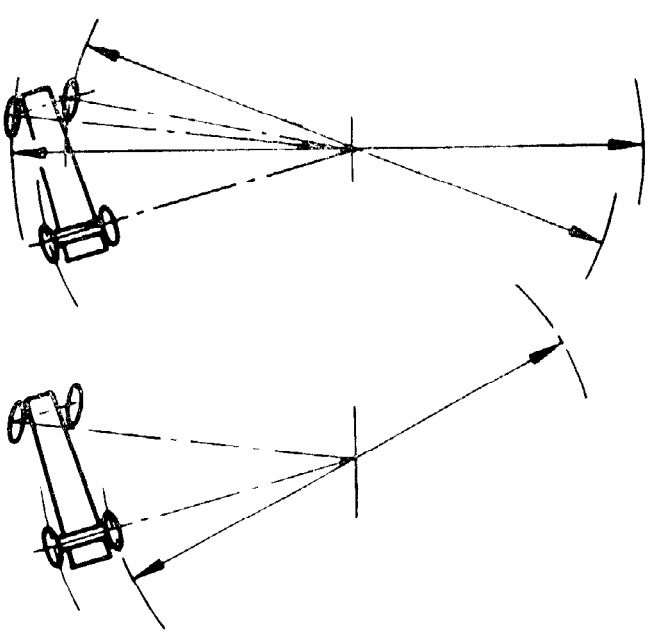
Clause	Term	Definition	Drawing
4.14.2	Chassis without cab but with an enclosure for the engine intended to form an external part of the vehicle	a) plane *E* touches the back of the foremost predominating surface of the dash panel in the area directly ahead of the driving position of the vehicle, disregarding flanges and localized depressions; b) plane *F* is defined as in **4.14.1.**	
4.14.3	Chassis supplied complete with driver's cab	a) plane *E* passes through the foremost part of the body which is behind the driver's cab; b) plane *F* is defined as in **4.14.1.**	
4.15	Maximum Internal Dimensions of Body (Commercial Vehicles)	The interior length, width and height of the body without taking into account internal projections (wheelboxes, ribs, hooks, etc). **Note 1** — However, the presence of internal projections should be noted. **Note 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.	
4.16	Drawgear Length	The distance between the axis of the drawbar eye (in a vertical position) and the vertical plane passing through the axes of the front wheels of the trailer.	

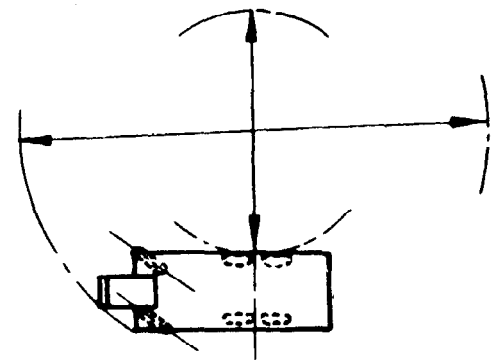
Clause	Term	Definition	Drawing
4.17	Drawbar Length	The distance between the drawbar eye (in a vertical position) and the vertical plane passing through the axis of the pin fixing the drawbar to the trailer [plane perpendicular to the longitudinal median plane (*see* **3**) of the trailer].	
4.18	Position of Towing Attachment	This attachment assumes as its plane of symmetry the longitudinal median plane (of the vehicle) (*see* **3**). Its position is defined by the dimensions defined in **4.18.1** to **4.18.3.**	
4.18.1	Overhang of Attachment	The distance from the attachment to the vertical plane perpendicular to the longitudinal median plane (*see* **3**) and passing through the axis of the rearmost axle (plane *V*), i.e., the distance to plane *V*: a) for a ball, from the centre of the ball; b) for a jaw, from the vertical plane passing through the axis of the pin and parallel to plane *V*; c) for a hook, from the centre of the meridian section of the corresponding toroidal ring, the axis of the section being vertical.	
4.18.2	Height of attachment	The distance from the attachment to the supporting plane, i. e., the distance from the supporting plane: 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; c) for a hook, to the centre of the meridian section of the corresponding toroidal ring, the axis of this section being vertical.	

Clause	Term	Definition	Drawing
4.18.3	Distance of towing attachment in front of rear of vehicle	The distance from the attachment as defined in **4.18.1** (a), (b) or (c) to the vertical plane *W* perpendicular to the longitudinal median plane (*see* **3**) and passing through the rear of the body. **Note** — In determining the position of plane *W*, minor projections such as tail-gate hinges, latches, etc, are disregarded.	
4.19	Fifth Wheel Lead	*See* **4.19.1** to **4.19.2** **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.	
4.19.1	Fifth wheel lead for calculation of length	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) (*see* **3**).	
4.19.2	Fifth wheel lead for calculation of load distribution	The distance from the horizontal axis of the pivot of the fifthwheel 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* **3**).	
4.20	Height of Coupling Face	The maximum distance from the centre of the seating of the kingpin to the bearing plane. This point is situated in the horizontal plane touching the upper part of the seat.	

Clause	Term	Definition	Drawing
4.21	Distance Between Towing Device and Front End of Towing Vehicle	*See* 4.21.1 and 4.21.2	
4.21.1	Distance between jaw and front end of towing vehicle	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* **3**) and touching the front part of the towing vehicle.	
4.21.2	Distance between kingpin and front end of towing vehicle	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* **3**) and touching the front end of the vehicle.	
4.22	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.	
4.23	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.	
4.24	Camber Angle	The acute angle formed by a vertical line and the mid-plane of the wheel. The angle is positive when the wheel leans out at the top. **Note** — This angle is measured in the unladen condition of the vehicle.	

Clause	Term	Definition	Drawing
4.25	Kingpin Inclination	The projection onto a plane perpendicular to the longitudinal median plane (of the vehicle) (*see* 3) of the acute angle, formed by the vertical and the real or imaginary swivelling axis of the stub axle. **Note** — This angle is measured in the unladen condition of the vehicle.	
4.26	Kingpin Offset	The distance from the extension of the swivelling 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.	
4.27	Toe-In	*See* **4.27.1** and **4.27.2**	
4.27.1	Toe-In (length)	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.	
4.27.2	Toe-In (angle)	The angle formed by the horizontal diameter of the wheel and the longitudinal median plane (of the vehicle) (*see* 3) or the acute angle α formed by the vertical plane *G* passing through the axis of the axle-pin and a vertical plane *H* perpendicular to the longitudinal median plane (of the vehicle).	

Clause	Term	Definition	Drawing
4.28	Castor	The distance between two points *p* and *q* : this distance is the projection onto a plane parallel to the longitudinal median plane (of the vehicle) (*see* **3**) of the acute angle formed by the vertical and the real or imaginary swivelling axis of the stub axle. It is positive when *q* is ahead of *p* in the direction of normal travel.	
4.29	Vertical Clearance (Buffer Clearance)	The vertical displacement of a wheel in relation to the suspended part of the vehicle from the position corresponding to the maximum permissible load to the position from which any additional vertical travel is impossible. **Note** — The maximum permissible load is that recommended by the manufacturer.	
4.30	Lift	The height to which a wheel may be lifted without any other wheels leaving their supporting surface.	
4.31	Turning Circles	The diameters of the circles circumscribing the extensions on the supporting plane of the mid-planes of the steered wheels (the steering wheel being turned to the full lock). **Note 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. **Note 2** — Each vehicle has left-hand and right-hand turning circles.	

Clause	Term	Definition	Drawing
4.32	Turning Clearance Circles	The turning clearance circles (the steering wheel being turned to full lock) are: a) The diameter of the smallest circle enclosing the projections onto the supporting plane of all points of the vehicle. b) The diameter of the largest circle beyond which are located the projections onto the supporting plane of all the points of the vehicle. **Note** — Each vehicle has right-hand and left hand turning clearance circles.	

EXPLANATORY NOTE

This Indian Standard is in agreement with the international standard ISO 612-1978 Road vehicles — Dimensions of motor vehicles and towed vehicles — Terms and definitions, issued by the International Organization for Standardization (ISO), except the term 'Wheel Base' defined in **4.4** and **4.4.1**. In ISO 612-1978 this term is called 'Wheel Space'. Since in India it is commonly understood as 'Wheel Base', therefore, this term has been adopted.

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