

Total Area excluded for purpose of calculating seated passenger capacity	Sum (Ad+As+Ae+Aw+Ag+Ast+Ap)	Aex
Area of Gangway	-	Ag
Total internal Floor Area	Internal Width x Internal Length	Aint
Area for seated Passengers	Aint-Aex	Apass
Area for standee passengers	Ag – (Ac + Asl + 150mm x Length of Gangway)	Astd

Note : Value of Astd is the solution of following three equations –

$$A_{ex} = A_d + A_s + A_e + A_w + A_{sl} + A_g + A_{st} + A_p$$

$$A_{pass} = A_{int} - (A_{ex} + A_g)$$

$$A_{std} = A_{int} - (A_d + A_s + A_e + A_w + A_{st} + A_c + A_p + A_{sl} + A_{pass} + 150\text{mm} \times \text{Length of Gangway})$$

2.2.18.5

Formula for calculation of number of seats and number of standees permitted.

Seating Capacity

a	No. of Seats accommodated with respect to space available in bus	$A_{pass} / (\text{seat Spacing} \times \text{seat width})$
b	No. of seats accommodated with respect to payload*	
c	Seating Capacity (Lowest of a and b)	

Standee Capacity

a1	No. of Standee accommodated with respect to space available in bus	$A_{std} \times 6 \times 10^{-6}$
b1	No. of standee accommodated with respect to payload ((Payload/75) – c)	
c1	Standee Capacity (lowest of a1 and b1)	
*Pay load for single passenger shall be 75 Kg (68 Kg Person's weight+ 7Kg Weight).		

2.2.19

Provisions for Differently Abled Passengers

2.2.19.1

All Type I buses shall have at least two passenger seats in case of Mini & Midi buses and four passenger seats in case of other buses designated as priority seats for persons with disabilities. These seats shall be only of the forward facing type and preferably be located behind the driver's seat.

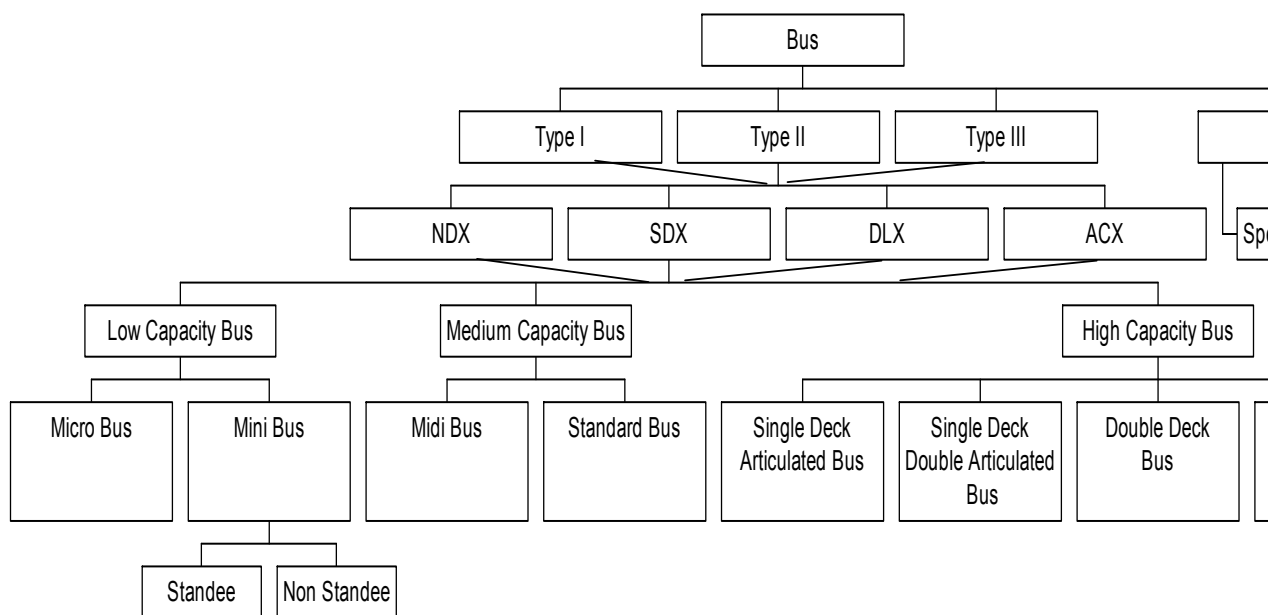
- 2.2.19.2 The seats designated for Differently Abled Passengers shall be indicated with appropriate sign(s). An illustration of the signs to be provided above the priority seats is shown in Figure 16.
- 2.2.19.3 The priority seats shall be provided with appropriate facility for securing the crutches, canes, walkers etc. to facilitate convenient travel for persons with disabilities.
- 2.2.19.4 Handrails and / or stanchions shall be provided at the entrance of all Type I buses in a configuration, which allows persons with disabilities to grasp such assists from outside the vehicle while starting to board, and to continue using such assists throughout the boarding process, until they reach the designated seating area. The dimensions of the hand rails shall be as per para 2.2.9.
- 2.2.19.5 All Type I NDX buses shall be provided with controls adjacent to priority seats for requesting stops and which alerts the driver that a mobility aid user wishes to disembark. Such a system shall provide auditory and visual indications that the request has been made. Controls shall be mounted not higher than 1300 mm and now lower than 410 mm above the floor, shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls shall not be greater than 2.2 kg.
- 2.2.20 Side Underrun Protection**
- 2.2.20.1 The requirements of Side under run protection shall be in accordance with IS-14682:2004, as amended from time.
- 2.2.21 Rear Underrun Protection**
- 2.2.21.1 The requirements of Rear Under run Protection shall be in accordance with IS-14812:2005, as amended from time to time.
- 2.2.22 Provision of Toilet**
- 2.2.22.1 In case of Type III ACX buses a toilet may be provided.
- Note :** The requirements for various categories of buses are also provided in matrix form in Appendix 3.
- 2.2.23 External Projections:**
- 2.2.23.1 The requirements of external projections shall be in accordance with IS: 13942 - 1994, as amended from time to time and as notified under Rule 124 of the Central Motor Vehicles Rules, 1989.
- 2.2.24 Interior Fittings:**
- 2.2.24.1 The requirements of interior fittings shall be in accordance with AIS-047, as amended from time to time and as notified under Rule 124 of the Central Motor Vehicles Rules, 1989.

2.2.25 Public Information System

- 2.2.25.1 All Type I, Type II and Type III public service buses shall be provided with Audio / Visual or Audio-Visual Information System permitting driver or recorded or digitized human speech / visual messages, to inform passengers inside the bus regarding emergency escape provisions, destination, bus stops etc. This arrangement will enhance passenger safety.
- 2.2.25.2 All Type I, Type II and Type III public service buses shall be provided with a emergency declaration switch to be operated by the driver / co-driver. This switch should activate a Audio hooter and Visual red blinking light inside and amber light outside the bus to declare an emergency for speedy evacuation of the passengers.

ANNEXURE 1
(Sec 2.0)

Categorisation of Buses



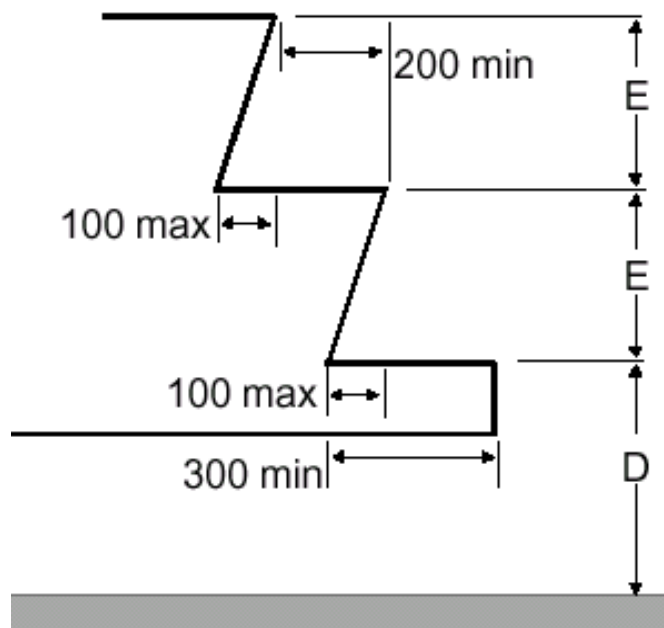


Figure 1
Steps

Classes		I	II, III
First step from ground 'D'	Max. height (mm)	340 (1)(2)	380 (1)(2)(5)
	Min. depth (mm)	300 */	
Other steps 'E'	Max. height (mm)	250 (3)	Other steps 'E'
	Min. height (mm)	120	
	Min. depth (mm)	200	
*/		180 mm for vehicles having a capacity not exceeding 22 passengers.	
(1)		700 mm in the case of an emergency door. 1500 mm in the case of an emergency door in the upper deck of a double deck vehicle.	
(2)		400 mm in the case of Type I bus with solely mechanical suspension and 430 mm in the case of Type II and Type III vehicles with solely mechanical suspension	
(3)		300 mm in the case of steps at a door behind the rearmost axle.	
(4)		250 mm in gangways for vehicles having a capacity not exceeding 22 passengers.	
(5)		For at least one service door; 400 mm for other service doors.	
Note:		1. At a double doorway the steps in each half of the access passage shall be treated separately.	
		2. E need not be the same for each step.	

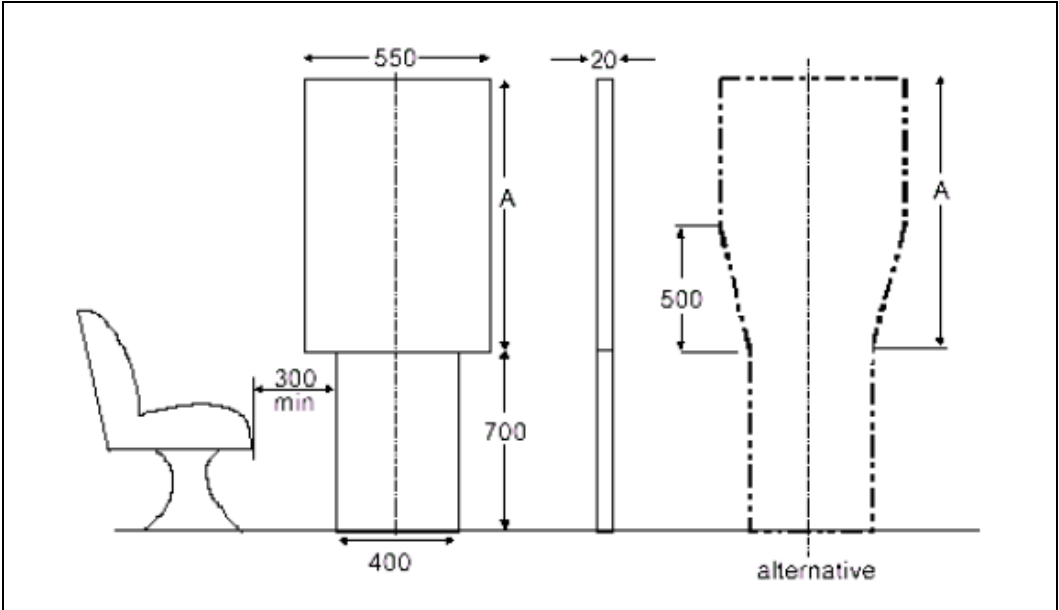


Figure 2
Access to Service Doors

	Dimensions in mm				
	Other than Midi and Mini Bus			Midi and Mini bus	
				Standee	Standee
Width of upper panel	550			550	550
Height of upper panel (A)	Type I	1100	1100*	950/950*	700/950*
	Type II	950			
	Type III	850			
Total height of dual panel	Type I	1800		1650	1400
	Type II	1650			
	Type III	1550			
* Alternate trapezoidal section having a height of 500mm, forming the transition between the width of the upper and the lower panel, may be used. In this case, the total height of the rectangle section and this trapezoidal section of the upper panel shall be 1100 mm for all types of vehicles other than Midi and Mini buses, and 950 mm for Midi and Mini buses.					

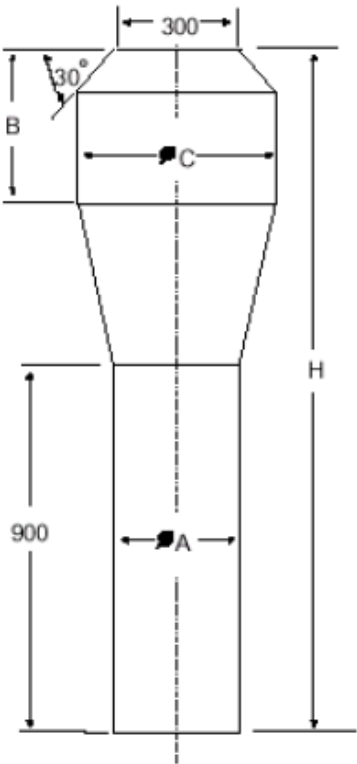


Figure 3
Gangways

	Other than Midi and Mini Bus			Midi and Mini Bus	
	Type I	Type II	Type III	Standee	Non Standee
Diameter of the lower cylinder(A)	450	350	300	350	300
Height of lower cylinder	900	900	900	900	900
Diameter of the upper cylinder(C)	550	550	450	550	450
Height of upper cylinder(B)	500	500	500	500	300
Overall Internal height(H)	1900	1900	1900	1750	1500

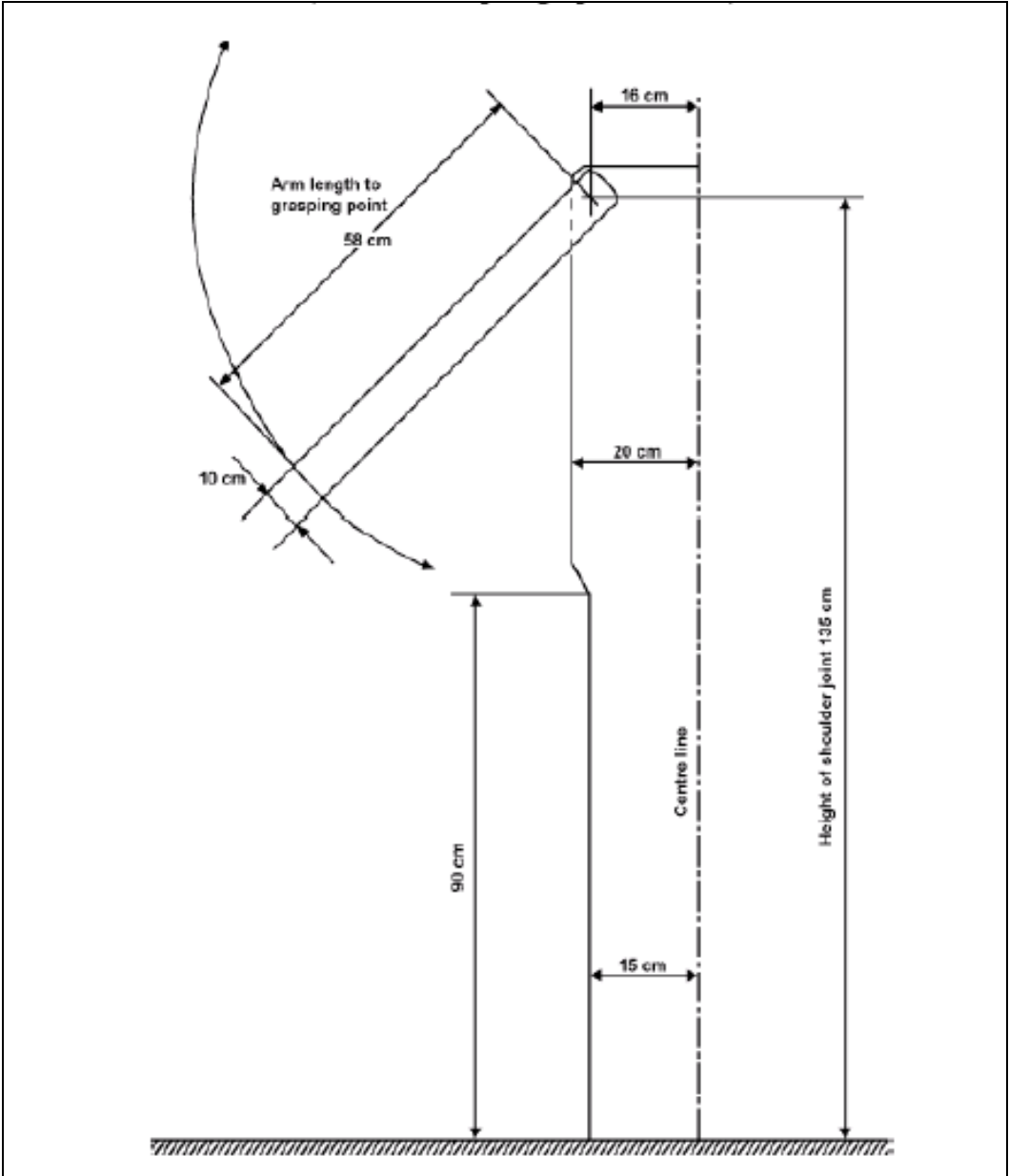


Figure 4
Siting of Hand Holds – Testing of Hand Holds

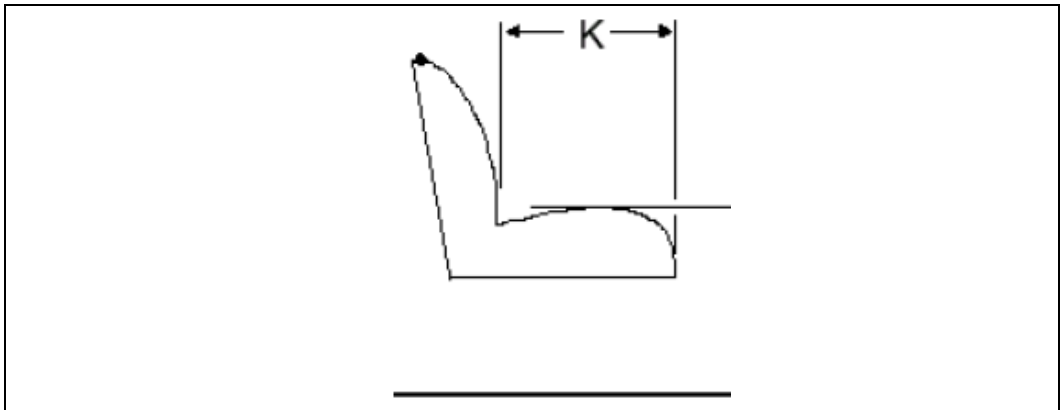


Figure 6
Depth of Seat Cushion

The minimum depth of seat cushion shall be as follows:

	Type I				Type II & III		
Depth of seat cushion,(K) in mm	NDX	SDX	DLX	ACX	SDX	DLX	ACX
	350	350	350	350	400	400	400

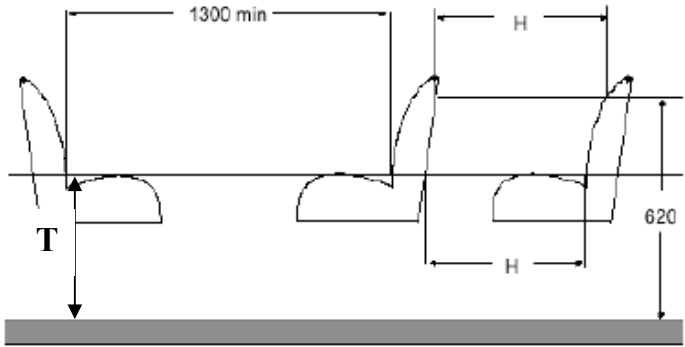


Figure 7
Seat Spacing

	NDX	SDX	DLX	ACX
Type I	650	650	650	650
Type II	680	680	680	680
Type III	-	680	680	680

	Passenger Seat The diagram illustrates the minimum torso angle for a passenger seat. It shows a side profile of a seat with a dashed vertical line representing the reference line. The torso angle α is the angle between the torso and this reference line. The 'R POINT' is marked on the seat back. The 'HEIGHT' is indicated by a horizontal line from the reference line to the seat back. The 'TORSOREFERENCE LINE' is a dashed line extending from the R POINT. The 'MINIMUM TORSO ANGLE α' is shown at the bottom of the diagram.
	Minimum torso angle
	NDX : 12 deg. SDX, DLX & ACX : 15 deg.
	Figure 8 Passenger seat torso angle



FIGURE 9

Seat Base Thickness

The thickness of seat base in mm may be as follows:

		Type I & II				Type III		
		NDX	SDX	DLX	ACX	SDX	DLX	ACX
	Thickness of seat cushion front edge (min)	90	110	130	130	110	130	130
	Thickness of seat cushion Rear edge (min)	60	80	100	100	80	100	100

Seat Back Thickness

The thickness of seat cushion back in mm may be as follows:

	NDX	SDX	DLX	ACX
Type I	25	25	50	50
Type II	25	50	75	75
Type III	-	50	75	75

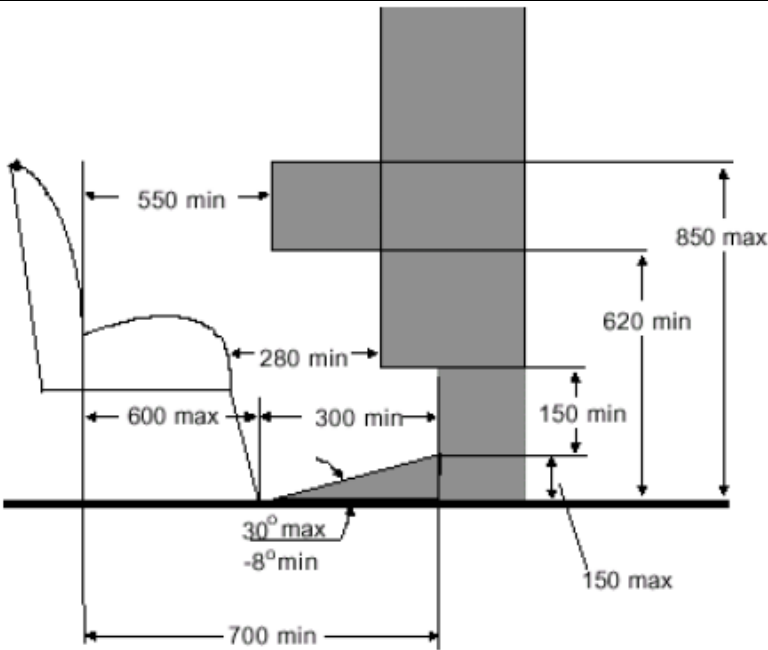


Figure 10
Passenger Seat Space for Seated Passenger

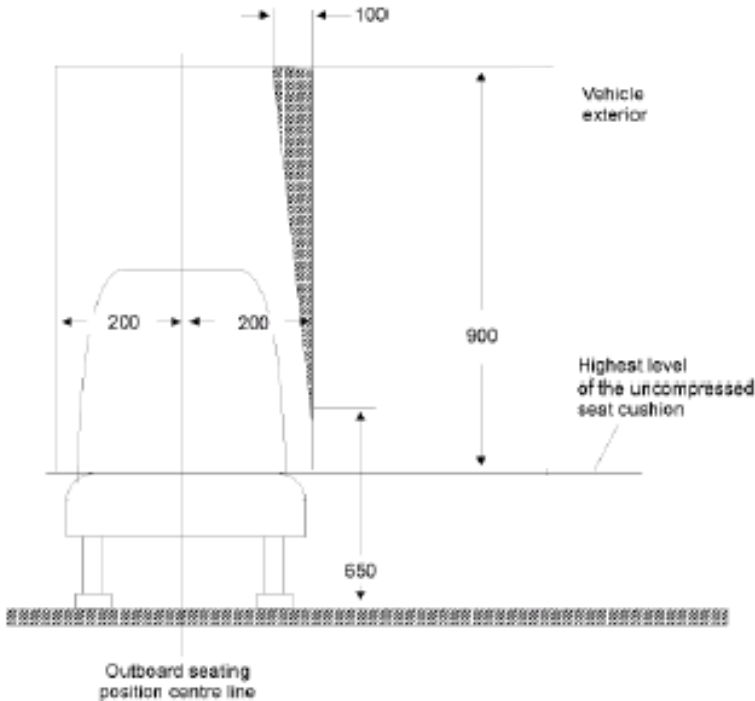


Figure 11
Permitted Intrusion above Seating Position

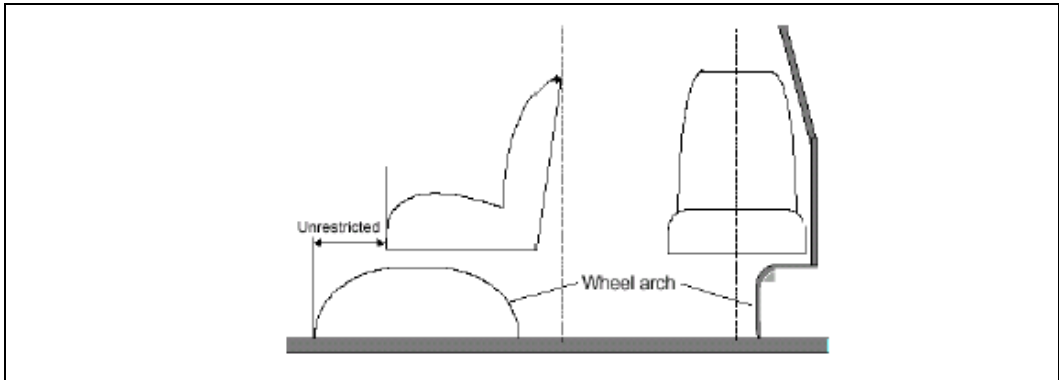


Figure 11A
Permitted Intrusion of a Wheel Arch not extending beyond the vertical centre line of the side seat

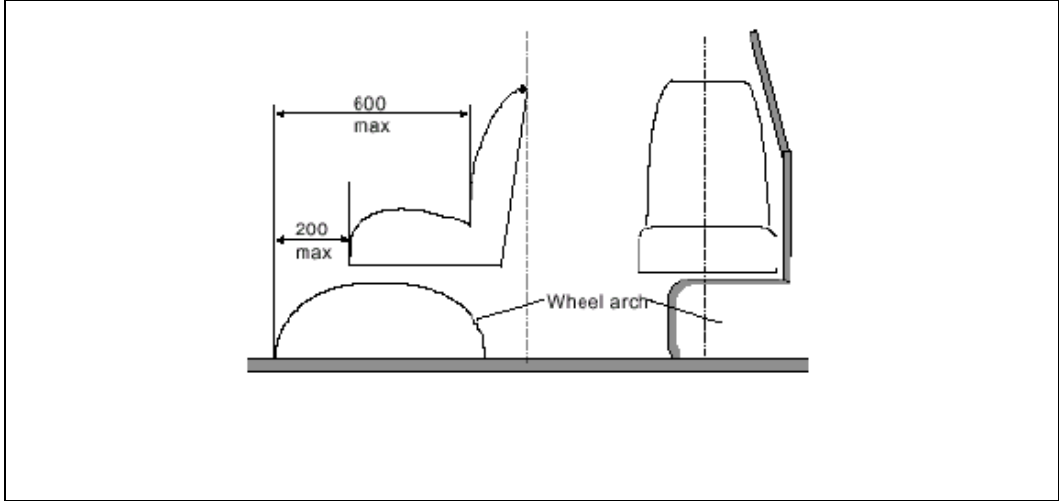
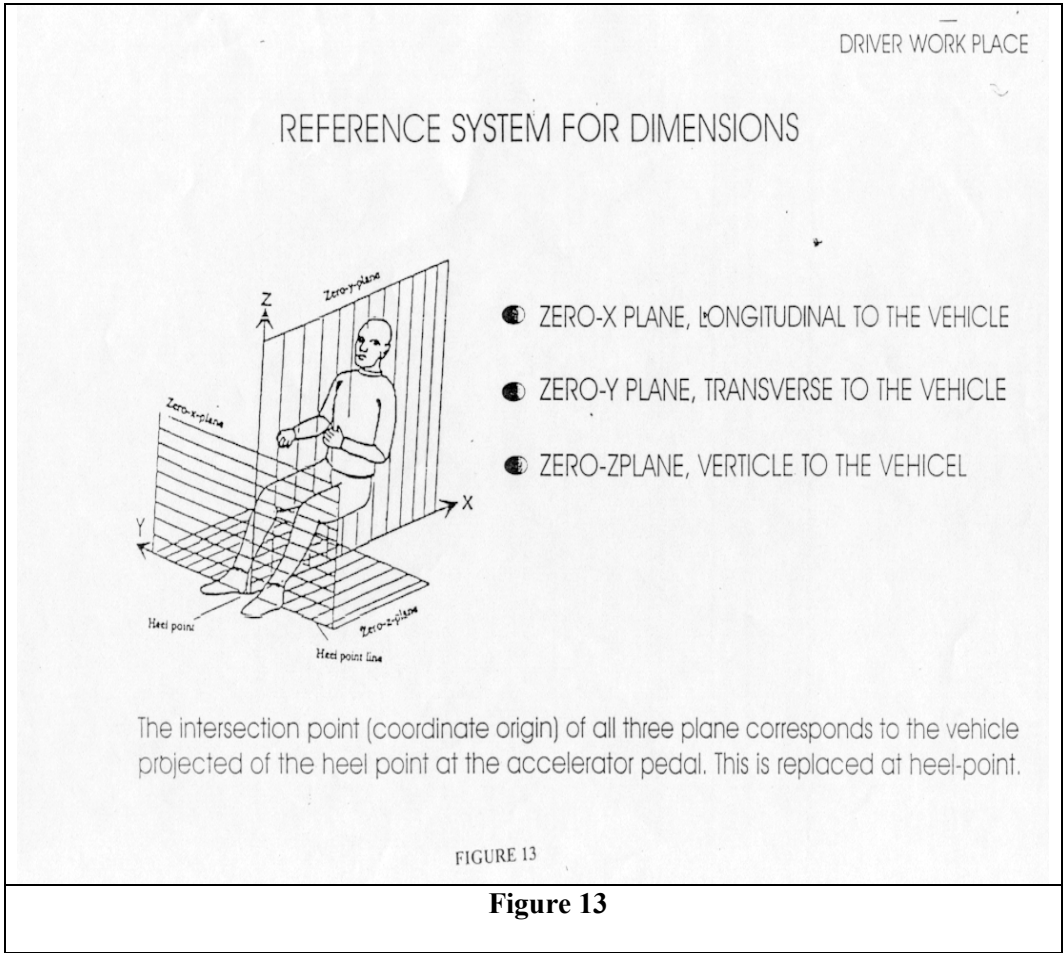
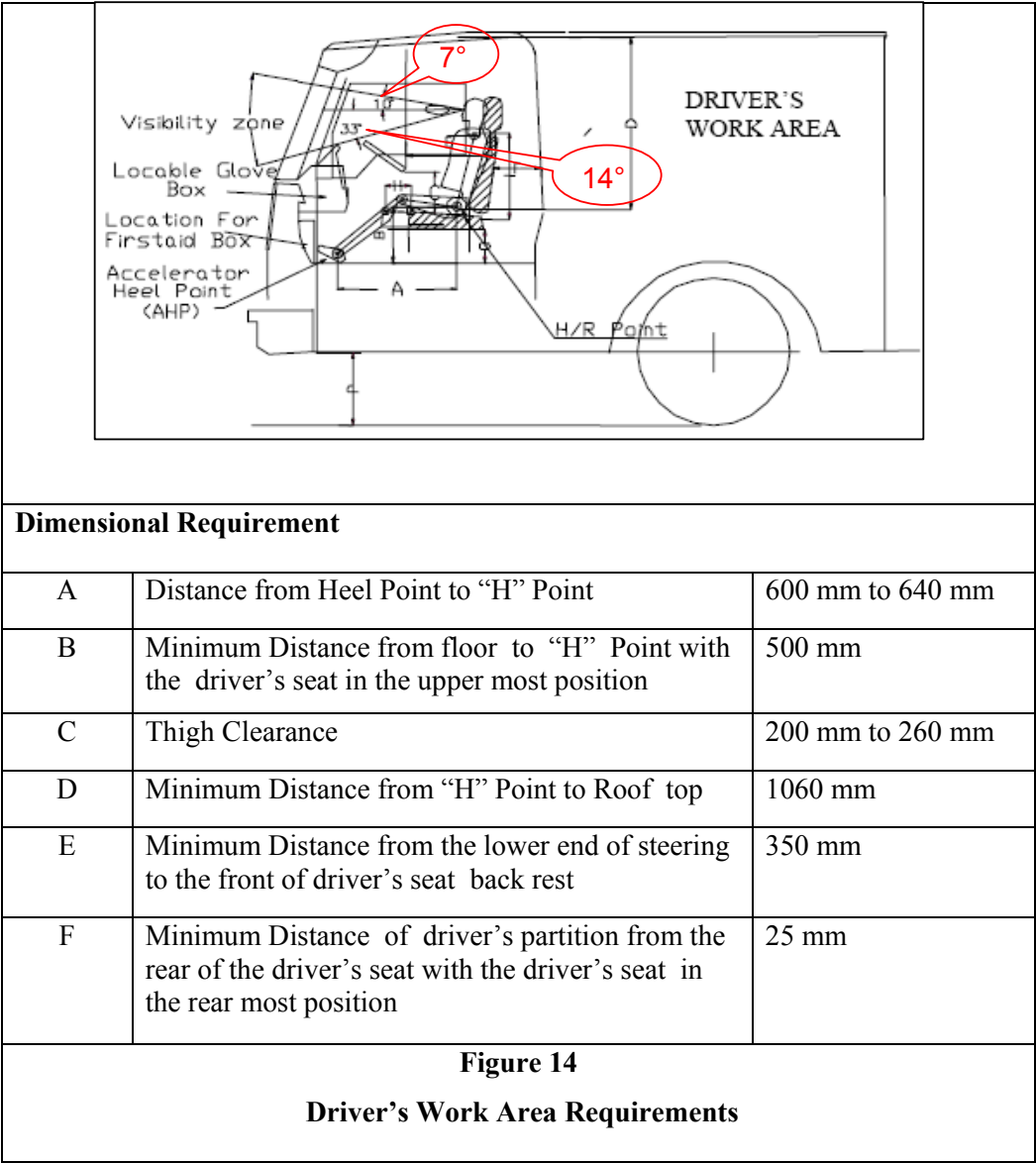


Figure 11B
Permitted Intrusion of a Wheel Arch extending beyond the vertical centre line of the side seat

Figure 12

Reserve





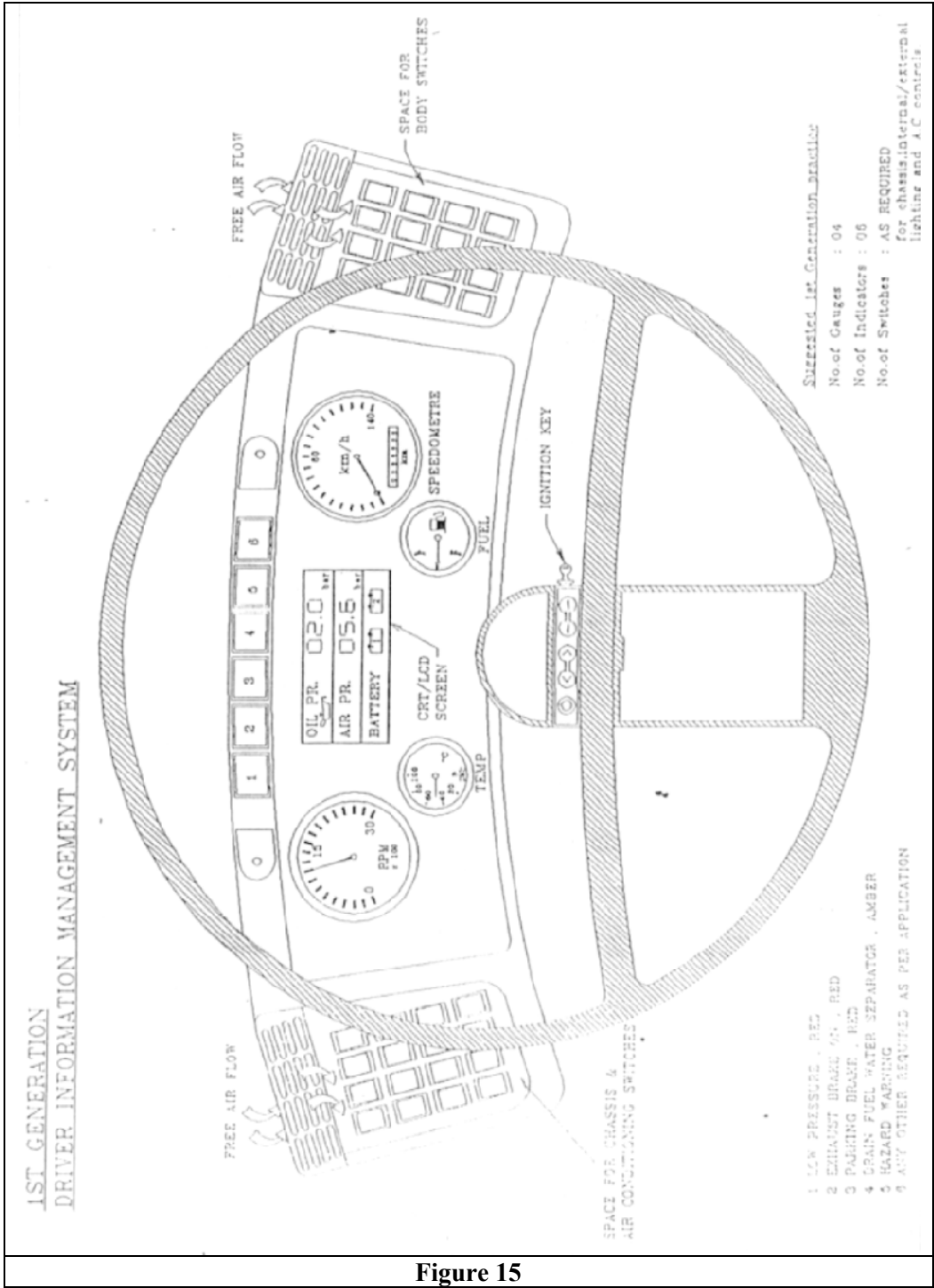


Figure 15



Figure 16
Pictogram for Passengers with Reduced Mobility

CHAPTER : 3

TECHNICAL & SAFETY REQUIREMENTS

3.1 Body Structure Strength

- 3.1.1. The body structure of all single deck buses of Type II and Type III category excluding Mini buses, shall be of sufficient strength, to meet the test requirements in Chapter 6, para 6.1.

3.2 Body Structure Stability

Stability Test of the body structure of single as well as double deck vehicles of categories Type I, Type II, Type III & Type IV shall meet the requirements test defined in Chapter 6, para 6.2.

3.3 Reserved

3.4 Doors

- 3.4.1 The structure of the door shall be able to withstand distortion due to forces induced during its operation and the operability of door components critical to the removal of the passengers after an accident shall be ensured.

- 3.4.2 The external side of the door shall not have any projection. The hinges and door handles shall meet requirements as specified in IS13942:1994, as amended from time to time.

- 3.4.3 Door shall be fitted with weather resistant EPDM rubber seals of suitable design to avoid dust and water ingress.

3.4.4 Service doors

- 3.4.4.1 All Type I buses, except NDX shall be provided with Power Operated Service Door(s). The Power Operated Service Door shall be optional in the Type I NDX buses. Type II & Type III buses shall be provided with Power Operated or Manually Operated Service Doors(s).

- 3.4.4.2 Service door shall be capable of being easily opened from inside and from outside the vehicle when the vehicle is stationary. However this requirement does not preclude the possibility of locking the door from the outside, provided the door can be always opened from inside.

- 3.4.4.3 The control or device for opening a service door from the outside shall be located at a height of 1000 mm to 1500 mm from the ground level. The measurement shall be carried out in the unladen condition on level surface

- 3.4.4.4 Single piece manually operated service door which is hinged or pivoted shall be such that in the event the open door comes in contact with a external object while the vehicle is in forward motion the door shall tend to close.

- 3.4.4.5 Where direct view is not adequate, optical or other devices shall be installed to enable the driver to detect from his seat the presence of a passenger in the immediate interior or exterior vicinity of every service door.
- 3.4.4.6 Manually operated service doors fitted with slam type lock shall be of the two stage type.
- 3.4.4.7 On the inside of a service door there shall not be any device intended to cover the inside steps when the door is closed. The door operating mechanism and other equipment attached to the inside door should not pose safety hazard for the passengers.
- 3.4.4.8 For every door which opens inwards, the mechanism shall be so constructed that its movement is not likely to cause injury to the passengers during normal use. Where necessary suitable protection devices may be provided.
- 3.4.4.9 **Additional Requirements for Power Operated Service Doors**
- 3.4.4.9.1 In the event of an emergency every power operated door shall be capable of
- being opened from inside when the vehicle is stationary even when locked from outside, by controls with or without power supply by which the door normally operates.
 - Overriding all the other door controls.
 - Being operated by a single person easily by hand.
 - The controls shall be easily seen and identified by a person approaching the door or standing in front of the door.
 - The interior controls are placed on or within 300 mm of the door, at a height not less than 1,000 mm above the first step.
- 3.4.4.9.2 The construction and control system of every power operated service door be such that a passenger is unlikely to be injured by the door or trapped between the door while closing. The door system shall meet the test requirements defined in Test methods para 6.5.
- 3.4.4.9.3 The movement of the doors shall not be abrupt.
- 3.4.4.10 **Additional Requirements for Automatic doors**
- 3.4.4.10.1 **Activation of opening circuits**
- 3.4.4.10.1.1 The opening controls of every automatically operated service door shall be capable of being activated and deactivated only by the driver from his seat. However provision in para 3.4.4.9.1 shall apply in the event of an emergency.

3.4.4.10.1.2 Activation of opening controls by the driver shall indicate the status by means of indicators (illuminated push button/sign) placed on or adjacent to the door whose control has been activated.

3.4.4.10.2 Opening of automatically operated Service Doors

3.4.4.10.2.1 After activation of the opening controls by the driver, the passenger shall be able to open the door by one of the methods below :

- from inside by a push button control or a passing through a light barrier.
- from outside by a illuminated push button clearly indicating status.

3.4.4.10.3 Closing of automatically operated Service Door

3.4.4.10.3.1 The automatically operated service door shall close automatically after a time interval of opening of the door. If a passenger enters or exits during this time interval, a safety device (e.g. a foot board contact, light barrier) shall ensure that the time until the door closes is sufficiently extended.

3.4.4.10.3.2 If a passenger enters or exits while the door is closing, the closing process shall be interrupted and the door shall return to the open position.

3.4.5 Emergency Exits

3.4.5.1 Emergency Doors

3.4.5.1.1 The emergency doors shall be capable of operation from both inside and outside when operated manually. However this requirement shall not be construed as precluding possibility of locking the door from outside provided the door can be opened from inside.

3.4.5.1.2 The outside handles of emergency doors shall lie within 200 mm on either side of centreline of the door drawn in the horizontal plane. However, the position of the outside handle shall not be more than 1800 mm above the ground level in the unladen condition.

3.4.5.1.3 Doors shall be hinged at the forward edge and in case of horizontal door the hinge shall be on the top edge.

3.4.5.1.4 Emergency doors shall not be power operated or of sliding type.

3.4.5.1.5 Emergency doors shall open outward and shall be capable of remaining open outwards and at an angle of atleast 100°, such that aperture is clear of any obstructions.

3.4.5.1.6 Door check, stay or strap which is capable of meeting requirements specified in para 3.4.5.1.5 may be used.

3.4.5.1.7 The forward edge of the emergency door shall be behind or in the same transverse plane tangent to the rear-most point of a seat back adjacent to it.

3.4.5.1.8 All emergency doors shall be provided with an audible device to warn the driver when the emergency doors are not securely closed. The warning device shall operate due to the movement of the door catch and not by the movement of the door itself.