

63 Low floor vehicle

Refer to: R107 02-R2/C1

63.1 Effective date and Scope: From 2010/08/16, the following low floor vehicle having the area available for standing passengers, shall comply with this regulation.

63.1.1 Large passenger vehicles with wheelbase more than 4m.

63.1.2 Large passenger vehicles having the area available for standing passengers with wheelbase less than 4m, and gross vehicle weight more than 4.5MT.

63.2 "Low floor vehicle" is a vehicle in which at least 35 per cent of the area available for standing passengers forms an area without steps and includes access to at least one service door.

63.2.1 "Class I": For low floor vehicles having a capacity exceeding 22 passengers in addition to the driver, vehicles constructed with areas for standing passengers, to allow frequent passenger movement.

63.2.2 "Class II": For low floor vehicles having a capacity exceeding 22 passengers in addition to the driver, vehicles constructed principally for the carriage of seated passengers, and designed to allow the carriage of standing passengers in the gangway and/or in an area which does not exceed the space provided for two double seats.

63.2.3 "Class III": For low floor vehicles having a capacity not exceeding 22 passengers in addition to the driver; a vehicle of this class may have seats and shall have provision for standing passengers.

63.3 Low floor vehicle shall according to suitable variants and range of principle are as below:

63.3.1 The same vehicle category symbol.

63.3.2 The same axle set variant.

63.3.3 The same brand and vehicle type.

63.3.4 The same chassis brand.

63.3.5 Chassis manufacturers announced that the same chassis vehicle type.

63.3.6 The same low floor vehicle type.

63.4 The body specifications of low floor vehicle

63.4.1 Class I low floor vehicle shall comply with paragraph 63.5.1 and 63.6 to 63.13 of this regulation.

63.4.2 Class II low floor vehicle shall comply with paragraph 63.5.2. But Class II low floor vehicle which provides facilities for the disabled passengers shall comply with paragraph 63.6 to 63.13.

63.4.3 Class III low floor vehicle shall comply with paragraphs 63.5.1. But Class III low floor vehicle which provides facilities for the disabled passengers shall comply with paragraph 63.6 to 63.13.

63.4.4 Low floor vehicle shall comply with not only this regulation but also the regulation of “The requirement of specification for motor vehicle”. Besides, this regulation shall have priority if there was a repetition above.

63.4.5 The foot well of an outboard seating position for every class low floor vehicle, a zone of a cross-sectional area shall not exceeding, 0.03 m² and having a maximum width not exceeding 150 mm(Refer to Figure 1).

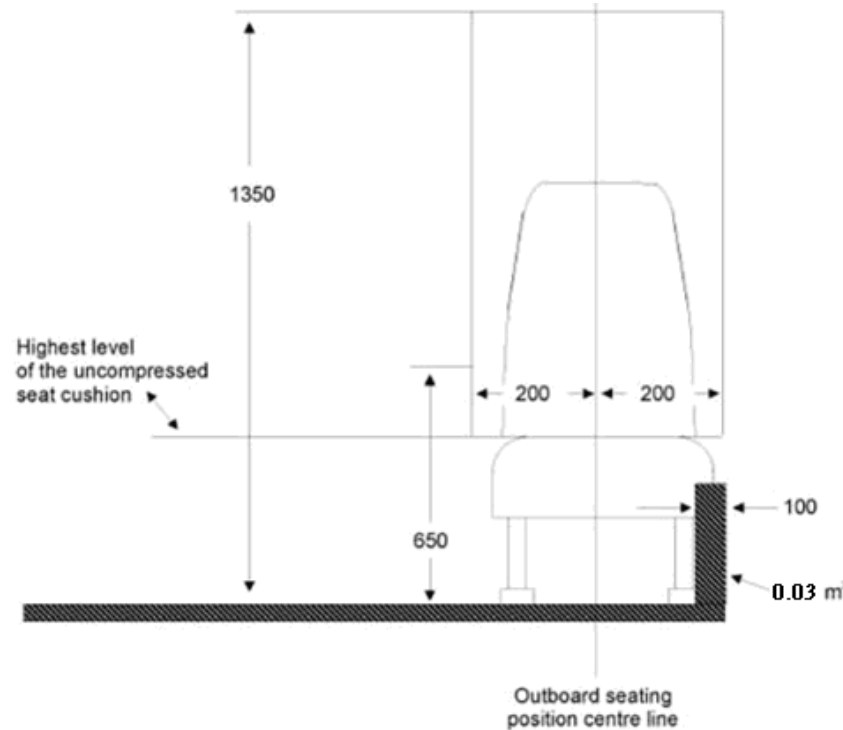


Figure 1: Permitted intrusion in lower part of passenger space

63.5 Steps

63.5.1 Class I and Class III low floor vehicle shall comply with the following stipulations.

63.5.1.1 The height of the first step from the ground of at least one service door shall not exceed 250 mm. In the case where only one service door meets this requirement there must be no barrier or sign which prevents that door from being used as both an entrance and an exit. A kneeling system and/or retractable step may be engaged, and that kneeling system shall comply with paragraph 63.13.

- 63.5.1.2 The first step from the ground shall not exceed 270 mm in two door openings, one entrance and one exit. A kneeling system and/ or retractable step may be engaged, and having kneeling system shall comply with paragraph 63.13.
- 63.5.1.3 The height of steps in an access passage at the above-mentioned door(s) shall comply with paragraph 63.5.1.1. or 63.5.1.2. , and in the gangway shall be not more than 200 mm.
- 63.5.1.4 The transition from a sunken gangway to a seating area shall not be considered to be a step.
- 63.5.2 Class II low floor vehicle shall comply with the following stipulations.
- 63.5.2.1 The height of the first step from the ground of at least one service door shall not exceed 320 mm. In the case where only one service door meets this requirement there must be no barrier or sign which prevents that door from being used as both an entrance and an exit. A kneeling system and/or retractable step may be engaged, and that kneeling system shall comply with paragraph 63.13.
- 63.5.2.2 The height of steps in an access passage at the above-mentioned door(s) shall comply with paragraph 63.5.2.1. , and in the gangway shall be not more than 250 mm.
- 63.5.2.3 The transition from a sunken gangway to a seating area shall not be considered to be a step.
- 63.6 Priority seats and space for passengers with reduced mobility
- 63.6.1 There shall be adequate space for a guide dog under, or adjacent to, at least one of the priority seats. This space shall not form a part of the gangway.
- 63.6.2 Armrests shall be fitted on seats between the seating position and the gangway and shall be capable of being moved easily out of the way to permit clear access to the seat.
- 63.6.3 The minimum width of a priority seat cushion, measured from a vertical plane passing through the centre of that seating position, shall be 220 mm on each side.
- 63.6.4 The height of the uncompressed seat cushion relative to the floor shall be such that the distance from the floor to a horizontal plane tangent to the front upper surface of the seat cushion is between 400 mm and 500 mm.
- 63.6.5 The foot space at priority seating positions shall extend forward of the seat from a vertical plane through the forward edge of the seat cushion. The foot space shall not have a slope in any direction of more than 8 percent.
- 63.6.6 Each priority seating position shall have a free height of not less than 1,300 mm for vehicles of Class I and III and 900 mm for vehicles of Class II, measured from the highest point of the uncompressed seat cushion. This free height shall extend over the vertical projection of the whole of the seat and the associated foot space.
- 63.6.7 Intrusion of a seat back or other object or the edge of gangway (if the seat is face toward gangway) into this space shall be permitted provided that a minimum clear vertical space extending 230 mm in front of the seat cushion is maintained. Where

the priority seat is positioned facing a bulkhead more than 1,200 mm in height this space shall be 300 mm. Intrusions of handholds or handrails as mentioned in paragraph 63.8.2 may protrude by a maximum of 100 mm from the sidewall into the clear space over the vertical projection of the foot space.

- 63.6.8 Vehicles fitted with a priority seat shall have pictogram(s), figure 2 visible from the outside, both on the front nearside of the vehicle and adjacent to the relevant service door(s). A pictogram shall be placed internally adjacent to the priority seat (at least 1 figure that it could recognize a passengers with reduced mobility other than wheelchair users of pictogram) .

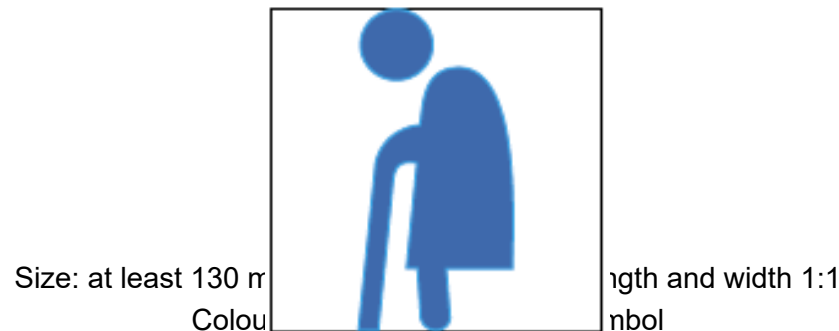


Figure 2: Pictogram for passengers with reduced mobility other than wheelchair users

63.7 Communication devices

- 63.7.1 Communication devices shall be placed adjacent to any priority seat and within any wheelchair area and shall be at a height between 700 mm and 1,200 mm above the floor.
- 63.7.2 Communication devices situated in the low floor area shall be at a height between 800 mm and 1,500 mm where there are no seats.

63.7.3 If a vehicle is fitted with a ramp or lift, a means of communication with the driver shall be fitted outside, adjacent to the door, and at a height between 850 mm and 1,300 mm from the ground. This requirement shall not apply to a door situated in the direct field of vision of the driver.

63.8 Handrails to priority seating

63.8.1 A handrail at a height of between 800 mm and 900 mm above the floor level shall be provided between the priority seats and at least one service door suitable for boarding and alighting. A break is permitted where it is necessary to gain access to a wheelchair space, a seat located at a wheel arch, a staircase, an access passage or a gangway. Any break in the handrail shall not exceed 1,050 mm and a vertical handrail shall be provided on at least one side of the break.

63.8.2 Handrails or handholds shall be placed adjacent to priority seating positions to facilitate entry and exit of the seat, and shall be designed in such a way as to allow the passenger to grasp them easily.

63.9 Floor slope: The slope of any gangway, access passage or floor area between any priority seat or wheelchair space and at least one entrance and one exit or a combined entrance and exit shall not exceed 8 per cent. Such sloping areas shall be provided with a slip-resistant surface.

63.10 Wheelchair accommodation provisions

63.10.1 For each wheelchair user provided for in the passenger compartment there shall be a special area at least 750 mm wide and 1300 mm long. The longitudinal plane of the special area shall be parallel to the longitudinal plane of the vehicle (wheelchair toward the head of vehicle) or parallel to the transverse plane of the vehicle (wheelchair toward the gangway) and the floor surface of the special area shall be slip resistant and the maximum slope in any direction shall not exceed 5 per cent. In the case of a wheelchair space designed for a forward facing wheelchair, the top of preceding seat-backs may intrude into the wheelchair space if a clear space is provided as shown in figure 3.

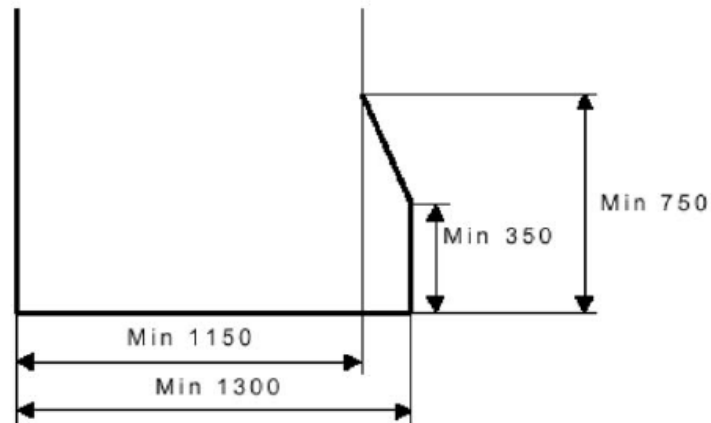
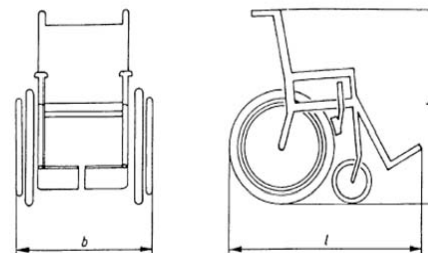


Figure 3: Minimum clear space for the wheelchair user at the wheelchair space

- 63.10.2 There shall be at least one doorway through which wheelchair users can pass. In the case of vehicles of class I, at least one wheelchair access door shall be a service door. The wheelchair access door shall bear a boarding device complying with the provisions of paragraph 63.14.3 (a lift) or 63.14.4 (a ramp).
- 63.10.3 A door for wheelchair access, that is not a service door, shall have a minimum height of 1,400 mm. The minimum width of all doors providing wheelchair access to the vehicle shall be 900 mm which may be reduced by 800 mm when the measurement is made at the level of handholds.
- 63.10.4 It shall be possible for a wheelchair user to move freely and easily from the outside of the vehicle through the door for wheelchair access into the special area(s) with the reference wheelchair, the dimensions of which are shown in figure 4.



Overall length, l: 1200 mm
Overall width, b: 700 mm
Overall height, h: 1090 mm

Figure 4 Reference wheelchair

Note: A wheelchair user seated in the wheelchair adds 50 mm to the overall length and makes a height of 1350 mm above the ground.

63.10.4.1 By "moving freely and easily", it is meant that there exists:

- (a) sufficient space available for the wheelchair user to manoeuvre without the assistance of a person;
- (b) there are no steps, gaps or stanchions which could be an obstacle to the free movement of the wheelchair user.

63.10.4.2 For the application of the above provisions, the test shall be performed, in the case of vehicles of Class I and III fitted with more than one wheelchair space, each wheelchair space shall accommodate for all wheelchairs which their specifications meet the requirements of the reference wheelchair.

63.10.5 In vehicles of Class I and III fitted with a ramp for wheelchair access, it shall be possible for a reference wheelchair having the dimensions shown in figure 4 to enter and exit a vehicle with the wheelchair moving in a forward direction.

63.10.6 Vehicles fitted with a wheelchair space shall have pictogram(s) in accordance with figure 5 visible from the outside, both on the front nearside of the vehicle and adjacent to the relevant service door(s). One of these pictograms shall be placed internally adjacent to each wheelchair space indicating whether the wheelchair is to be positioned facing the front of the vehicle.



Figure 5 Pictogram for wheelchair users

Size: at least 130 mm diagonal, the ratio of length and width 1:1

Colour: white basis with blue symbol

63.11 Seats and standing passengers in the wheelchair space

63.11.1 A vehicle may be equipped with demountable seats fitted in the wheelchair space provided that such seats may be easily removed by the driver or a crew member.

63.11.2 For vehicles of Class I, II and III, where the foot space of any seat, or part of a folding seat when in use, intrudes into a

wheelchair space, those seats shall have signs fixed on or adjacent to them with the following text, equivalent text or pictogram: "Please give up this space for a wheelchair user". This text shall be clear and letter square shall not be less than 50 mm.

- 63.11.3 In vehicles where any wheelchair space is designated for use exclusively by a wheelchair user, those spaces shall be clearly marked with the following text, equivalent text or pictogram: "Area designated for use exclusively by a wheelchair user".

63.12 Stability of wheelchairs

- 63.12.1 A wheelchair space shall be tested according to paragraph 63.12.2, and the wheelchair space shall be designed for the wheelchair user to travel facing forwards or gangway and shall be fitted with restraint systems. A wheelchair space shall be tested according to paragraph 63.12.2; and test result conformed to 63.12.3 is also conformed to this regulation.

63.12.2

- 63.12.2.1 A wheelchair space shall be fitted with a wheelchair restraint system suitable for general wheelchair application and shall allow the carriage of a wheelchair and a wheelchair user facing the front of the vehicle;

- 63.12.2.2 A wheelchair space shall be fitted with a wheelchair user restraint system which shall comprise of a minimum of two anchorage points and a pelvic restraint (lap belt) designed and constructed of components intended to perform in a similar manner to those of a seat belt conforming to "Safety Belt";

- 63.12.2.3 Any restraint system fitted to a wheelchair space shall be capable of being easily released in the case of an emergency;

- 63.12.2.4 Any wheelchair restraint system shall either:

- 63.12.2.4.1 Meet the dynamic test requirements described in paragraph 63.12.2.8 and be securely attached to vehicle anchorages meeting the static test requirements in paragraph 63.12.2.6; or

- 63.12.2.4.2 Be securely attached to vehicle anchorages such that the combination of restraint and anchorages meets the requirements of paragraph 63.12.2.8.

- 63.12.2.5 Any wheelchair user restraint shall either:

- 63.12.2.5.1 Meet the dynamic test requirements described in paragraph 63.12.2.9 and be securely attached to vehicle anchorages meeting the static test requirements in paragraph 63.12.2.6; or

- 63.12.2.5.2 be securely attached to vehicle anchorages such that the combination of restraint and anchorages meets the dynamic test requirements described in paragraph 63.12.2.9 when attached to anchorages set up as described in paragraph 63.12.2.6.7.

- 63.12.2.6 A static test shall be carried out on the anchorage points for both the wheelchair restraint system and the wheelchair

user restraint in accordance with the following requirements:

- 63.12.2.6.1 The forces specified in paragraph 63.12.2.7 shall be applied by means of a device reproducing the geometry of the wheelchair restraint system;
 - 63.12.2.6.2 The forces specified in paragraph 63.12.2.7.3 shall be applied by means of a device reproducing the geometry of the wheelchair user restraint.
 - 63.12.2.6.3 The forces in paragraph 63.12.2.6.1 and paragraph 63.12.2.6.2 shall be applied simultaneously in the forward direction and at an angle of 10 +/- 5 degrees above the horizontal plane;
 - 63.12.2.6.4 The forces in paragraph 63.12.2.6.1 shall be applied in the rearward direction and at an angle of 10 +/- 5 degrees above the horizontal plane;
 - 63.12.2.6.5 The forces shall be applied as rapidly as possible through the central vertical axis of the wheelchair space; and
 - 63.12.2.6.6 The force shall be maintained for a period of not less than 0.2 seconds.
 - 63.12.2.6.7 The test shall be carried out on a representative section of the vehicle structure together with any fitting provided in the vehicle which is likely to contribute to the strength or rigidity of the structure.
- 63.12.2.7 The forces specified in paragraph 63.12.2.6 are:
- 63.12.2.7.1 In the case of anchorages provided for a wheelchair restraint system fitted to a category M2 vehicle:
 - 63.12.2.7.1.1 1,110 +/- 20 daN applied in the longitudinal plane of the vehicle and towards the front of the vehicle at a height of not less than 200 mm and not more than 300 mm measured vertically from the floor of the wheelchair space, and
 - 63.12.2.7.1.2 550 +/- 20 daN applied in the longitudinal plane of the vehicle and towards the rear of the vehicle at a height of not less than 200 mm and not more than 300 mm measured vertically from the floor of the wheelchair space;
 - 63.12.2.7.2 In the case of anchorages provided for a wheelchair restraint system fitted to a category M3 vehicle:
 - 63.12.2.7.2.1 740 +/- 20 daN applied in the longitudinal plane of the vehicle and towards the front of the vehicle at a height of not less than 200 mm and not more than 300 mm measured vertically from the floor of the wheelchair space, and
 - 63.12.2.7.2.2 370 +/- 20 daN applied in the longitudinal plane of the vehicle and towards the rear of the vehicle at a height of not less than 200 mm and not more than 300 mm measured vertically from the floor of the wheelchair space;
 - 63.12.2.7.3 In the case of anchorages provided for a wheelchair user restraint system the forces shall be in accordance with

the requirements of “Safety belt anchorage”. The forces shall be applied by means of a traction device as appropriate to the belt type as specified in “Safety belt anchorage”.

63.12.2.8 A wheelchair restraint system shall be subject to a dynamic test carried out in accordance with the following requirements:

63.12.2.8.1 A representative wheelchair test trolley of mass 85 kg shall, from a speed of between 48 km/h to 50 km/h to rest, be subject to a deceleration-time pulse:

63.12.2.8.1.1 exceeding 20 g in the forward direction for a cumulative period of at least 0.015 seconds;

63.12.2.8.1.2 exceeding 15 g in the forward direction for a cumulative period of at least 0.04 seconds;

63.12.2.8.1.3 exceeding a duration of 0.075 seconds;

63.12.2.8.1.4 not exceeding 28 g and for not more than 0.08 seconds;

63.12.2.8.1.5 not exceeding a duration of more than 0.12 seconds, and

63.12.2.8.2 For the above test, the wheelchair restraint system shall be attached to either:

63.12.2.8.2.1 anchorages fixed to the test rig which represents the geometry of the anchorages in a vehicle for which the restraint system is intended, or

63.12.2.8.2.2 anchorages forming part of a representative section of the vehicle for which the restraint system is intended, set up as described in paragraph 63.12.2.6.7.

63.12.2.9 A wheelchair user restraint shall comply with the test requirements specified in “Safety Belt” or an equivalent test to the deceleration-time pulse in paragraph 63.12.2.8.1. A seat belt approved to “Safety Belt” and so marked shall be deemed to comply.

63.12.2.10 A test in paragraph 63.12.2.6, 63.12.2.8. or 63.12.2.9. shall be deemed to have failed unless the following requirements are met:

63.12.2.10.1 no part of the system shall have failed, or shall have become detached from its anchorage or from the vehicle during the test;

63.12.2.10.2 mechanisms to release the wheelchair and user shall be capable of release after completion of the test;

63.12.2.10.3 in the test in paragraph 3.8.3.8. the wheelchair shall not move more than 200 mm in the longitudinal plane of the vehicle during the test;

63.12.2.10.4 no part of the system shall be deformed to such an extent after completion of the test that, because of sharp edges or other protrusions, the part is capable of causing injury.

63.12.2.11 Its operating instructions shall be clearly displayed adjacent to it.

63.12.3 Other equal tests

63.12.3.1 Each wheelchair space shall be provided with a restraint system capable of restraining the wheelchair and the wheelchair user.

63.12.3.2 This restraint system and its anchorages shall be designed to withstand forces equivalent to the ones required for the passenger seats and occupant restraint systems.

63.12.3.3 A static test shall be carried out in accordance with the following requirements:

63.12.3.3.1 the forces referred hereto shall be applied in forward and rearward directions, separately and on the restraint system itself;

63.12.3.3.2 the force shall be maintained for a period of not less than 0.2 seconds;

63.12.3.3.3 the restraint system shall be capable of withstanding the test. Permanent deformation, including partial rupture or breakage of the restraint system shall not constitute failure if the required force is sustained for the specified time. Where applicable, the locking device enabling the wheelchair to leave the vehicle shall be operable by hand after removal of the traction force.

63.12.3.4 In forward direction in the case of a separate wheelchair and wheelchair user restraint system

63.12.3.4.1 For category M2:

63.12.3.4.1.1 1,110 +/- 20 daN in the case of a lap belt. The force shall be applied on the wheelchair user restraint system in the horizontal plane of the vehicle and towards the front of the vehicle if the restraint system is not attached to the floor of the vehicle. If the restraint system is attached to the floor, the force shall be applied in an angle of 45 +/- 10 degrees to the horizontal plane of the vehicle and towards the front of the vehicle;

63.12.3.4.1.2 675 +/- 20 daN in the horizontal plane of the vehicle and towards the front of the vehicle on the lap portion of the belt and 675 +/- 20 daN in the horizontal plane of the vehicle and towards the front of the vehicle on the torso portion of the belt in the case of 3-point belt;

63.12.3.4.1.3 1,715 +/- 20 daN in an angle of 45 +/- 10 degrees to the horizontal plane of the vehicle and towards the front of the vehicle on the wheelchair restraint system;

63.12.3.4.1.4 the forces shall be applied simultaneously.

63.12.3.4.2 For category M3:

63.12.3.4.2.1 740 +/- 20 daN in the case of a lap belt. The force shall be applied on the wheelchair user restraint system in the horizontal plane of the vehicle and towards the front of the vehicle if the restraint system is not

- attached to the floor of the vehicle. If the restraint system is attached to the floor, the force shall be applied in an angle 45 ± 10 degrees to the horizontal plane of the vehicle and towards the front of the vehicle;
- 63.12.3.4.2.2 450 ± 20 daN in the horizontal plane of the vehicle and towards the front of the vehicle on the lap portion of the belt and 450 ± 20 daN in the horizontal plane of the vehicle and towards the front of the vehicle on the torso portion of the belt in the case of 3-point belt;
- 63.12.3.4.2.3 $1,130 \pm 20$ daN in an angle of 45 ± 10 degrees to the horizontal plane of the vehicle and towards the front of the vehicle on the wheelchair restraint system;
- 63.12.3.4.2.4 the forces shall be applied simultaneously.
- 63.12.3.5 In forward direction in the case of a combined wheelchair and wheelchair user restraint system.
- 63.12.3.5.1 For category M2;
- 63.12.3.5.1.1 $1,110 \pm 20$ daN in an angle of 45 ± 10 degrees to the horizontal plane of the vehicle and towards the front of the vehicle on the wheelchair user restraint system in the case of a lap belt;
- 63.12.3.5.1.2 675 ± 20 daN in an angle of 45 ± 10 degrees to the horizontal plane of the vehicle and towards the front of the vehicle on the lap portion of the belt and 675 ± 20 daN in the horizontal plane of the vehicle and towards the front of the vehicle on the torso portion of the belt in the case of 3-point belt;
- 63.12.3.5.1.3 $1,715 \pm 20$ daN in an angle of 45 ± 10 degrees to the horizontal plane of the vehicle and towards the front of the vehicle on the wheelchair restraint system;
- 63.12.3.5.1.4 the forces shall be applied simultaneously.
- 63.12.3.5.2 For category M3:
- 63.12.3.5.2.1 740 ± 20 daN in an angle of 45 ± 10 degrees to the horizontal plane of the vehicle and towards the front of the vehicle on the wheelchair user restraint system in the case of a lap belt;
- 63.12.3.5.2.2 450 ± 20 daN in an angle of 45 ± 10 degrees to the horizontal plane of the vehicle and towards the front of the vehicle on the lap portion of the belt and 450 ± 20 daN in the horizontal plane of the vehicle and towards the front of the vehicle on the torso portion of the belt in the case of 3-point belt;
- 63.12.3.5.2.3 $1,130 \pm 20$ daN in an angle of 45 ± 10 degrees to the horizontal plane of the vehicle and towards the front of the vehicle on the wheelchair restraint system;
- 63.12.3.5.2.4 the forces shall be applied simultaneously.
- 63.12.3.6 In rearward direction:
- 63.12.3.6.1 810 ± 20 daN in an angle of 45 ± 10 degrees to the horizontal plane of the vehicle and towards the rear of

the vehicle on the wheelchair restraint system.

63.12.3.7 In every case the forces shall be applied to the wheelchair user restraint system by means of a traction device appropriate to the belt type as specified in "Safety belt anchorage".

63.13 Provisions for boarding devices

63.13.1 General requirements:

63.13.1.1 The controls actuating the boarding devices shall be clearly marked as such. The extended or lowered position of the boarding device shall be indicated by a tell-tale to the driver.

63.13.1.2 In the event of the failure of a safety device, lifts, ramps and kneeling systems shall be incapable of operation, unless they can be safely operated by manual effort. The type and location of the emergency operating mechanism shall be clearly marked. In the event of power failure, lifts and ramps must be capable of manual operation.

63.13.1.3 Access to one of the service or emergency doors on the vehicle may be obstructed by a boarding device providing the following two conditions are satisfied from both inside and outside the vehicle.

63.13.1.3.1 The boarding device does not obstruct the handle or other device for opening the door.

63.13.1.3.2 The boarding device can be readily moved to leave the doorway clear for use in an emergency.

63.13.2 Kneeling system

63.13.2.1 A switch shall be required to enable operation of the kneeling system.

63.13.2.2 Any control which initiates the lowering or raising of any part or the whole of the bodywork relative to the road surface must be clearly identified and be under the direct control of the driver.

63.13.2.3 The lowering process shall be capable of being stopped and immediately reversed by a control both within the reach of the driver, whilst seated in the cab, and also adjacent to any other operating controls provided for the operation of the kneeling system.

63.13.2.4 Any kneeling system that is fitted to a vehicle shall not allow the vehicle to be driven at a speed of more than 5 km/h when the vehicle is lower than the normal height of travel.

63.13.3 Lift

63.13.3.1 General provisions

63.13.3.1.1 Lifts shall only be capable of operation when the vehicle is at standstill. Any movement of the platform shall be prevented unless a device preventing the wheelchair from rolling off has been activated or has automatically come into operation.

63.13.3.1.2 The lift platform shall not be less than 800 mm wide, and not less than 1,200 mm long and shall be capable of

operating when carrying a mass of at least 300 kg.

63.13.3.2 Additional technical requirements for power-operated lifts

63.13.3.2.1 The operating control shall be designed in such a way that, if released, it automatically returns to the off position. As it does so the movement of the lift shall immediately be stopped and it shall be possible to initiate a movement in either direction.

63.13.3.2.2 A safety device (e.g. reversing mechanism) shall protect areas not visible to the operator, where the movement of the lift might trap or crush objects.

63.13.3.2.3 In the event of one of these safety devices coming into operation, the movement of the lift shall immediately be stopped and movement in the opposite direction initiated.

63.13.3.3 Operation of power operated lifts

63.13.3.3.1 Where the lift is at a service door situated within the direct field of vision of the driver of the vehicle, the lift may be operated by the driver when in the driver's seat.

63.13.3.3.2 In all others cases, the controls shall be adjacent to the lift. They shall be capable of being activated and deactivated only by the driver from his seat.

63.13.3.4 Manually operated lift

63.13.3.4.1 The lift shall be designed for operation by controls adjacent to the lift.

63.13.3.4.2 The lift shall be so designed that excessive forces are not required to operate it.

63.13.4 Ramp

63.13.4.1 General provisions

63.13.4.1.1 The ramp shall only be capable of operation when the vehicle is at standstill.

63.13.4.1.2 Edges on the outside shall be rounded to a radius of no less than 2.5 mm. Corners on the outside shall be rounded to a radius of not less than 5 mm.

63.13.4.1.3 The useable surface of a ramp shall be at least 800 mm wide. The slope of the ramp, when extended or folded out on to a kerb of 150 mm in height, should not exceed 12 percent. The slope of the ramp, when extended or folded out to the ground, should not exceed 36 per cent. A kneeling system may be used to achieve this test.

63.13.4.1.4 Any ramp which when ready for use exceeds 1,200 mm in length shall be fitted with a device to prevent the wheelchair rolling off the sides.

63.13.4.1.5 Any ramp shall be capable of operating safely with a load of 300 kg.

63.13.4.1.6 The outer edge of ramp surfaces available for use by a wheelchair shall be clearly marked with a band of colour

- 45 mm to 55 mm in width which contrasts visually with the remainder of the ramp surface. The band of colour shall extend along the outermost edge and along both edges parallel to the direction of travel of the wheelchair.
- 63.13.4.1.7 A portable ramp must be secure when in its position for use. A portable ramp must be provided with a suitable position where it can be safely stowed and where it is readily available for use.
- 63.13.4.2 Modes of operation
- 63.13.4.2.1 Deployment and stowage of the ramp may be either manual or power-operated.
- 63.13.4.3 Additional technical requirements for power-operated ramps.
- 63.13.4.3.1 Deployment and stowage of the ramp shall be indicated by flashing yellow lights and an audible signal.
- 63.13.4.3.2 Deployment and stowage of the ramp that may create a risk of injury shall be protected by a safety device(s).
- 63.13.4.3.3 These safety devices shall stop the movement of the ramp when the ramp is subject to a mean reactive force not exceeding 150 N. The peak force may be higher than 150 N for a short time provided that it does not exceed 300 N. The reactive force may be measured by any method to the satisfaction of the Competent Authority.
- 63.13.4.3.4 The horizontal movement of a ramp shall be interrupted when a mass of 15 kg is placed upon it.
- 63.13.4.4 Operation of power-operated ramps.
- 63.13.4.4.1 Where the driver has adequate view of the ramp sufficient to monitor its deployment and use, to ensure the safety of passengers, the ramp may be operated by the driver when in the driver's seat. This requirement may be met by a suitable indirect vision device(s).
- 63.13.4.4.2 In all others cases, the controls shall be adjacent to the ramp. They shall be capable of being activated and deactivated only by the driver.
- 63.13.4.5 Operation of manually-operated ramp
- 63.13.4.5.1 The ramp shall be so designed that excessive forces are not required to operate the ramp.