

Informal document No. **GRSG-88-13**  
(88th GRSG session, 18-22 April 2005.  
agenda item 1.4.)

## SAFETY OF WHEELCHAIR PASSENGERS IN BUSES

(GRSG adhoc working group on the safety of wheelchair passengers in road vehicles  
Working document following the 4th meeting in London)

Transmitted by the expert from the United Kingdom

Notes:

This proposal is based on:

1. Regulation R.107.01 and includes extracts from that document.
2. Amendments contained in TRANS/WP.29/GRSG/2003/21 (107.02), TRANS/WP.29/GRSG/2003/22/Rev.2, (107.02S1) are shown in *italics*.
3. GRSG ad-hoc amendments which have been formally proposed in GRSGadhoc/SWPRV/04/26 are **double underlined**.
4. GRSG ad-hoc amendments which have been agreed but not yet formally proposed to GRSG are indicated **with a broken line**.
5. GRSG ad-hoc amendments which remain under discussion within the group are marked in **SMALL CAPITALS**.
6. All proposed new text is marked **bold** and deleted text ~~strikethrough~~.

1. **SCOPE**
- 1.1. This Regulation applies to every single-deck, double-deck, rigid or articulated vehicle of category M2 or M3 1/
- 1.2. However, the requirements of this Regulation do not apply to the following vehicles:
  - 1.2.1. Vehicles designed for the secure transport of persons, for example prisoners;
  - 1.2.2. Vehicles specially designed for the carriage of injured or sick persons (ambulances);
  - 1.2.3. Off-road vehicles.
  - 1.2.4. Vehicles specially designed for the carriage of schoolchildren.
- 1.3. The requirements of this Regulation apply to the following vehicles only to the extent that they are compatible with their intended use and function:
  - 1.3.1. Vehicles designed for use by police, security and armed forces;

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1/ As defined in Annex 8 to the Consolidated Resolution on the Construction of Vehicles (R.E.3) (TRANS/WP.29/78/Rev.1/Amend.2).

1.3.2. Vehicles which contain seating intended solely for use when the vehicle is stationary, but which are not designed to carry more than 8 persons (excluding the driver) when in motion. Examples of these include mobile libraries, mobile churches and mobile hospitality units. The seats in such vehicles which are designated for use when the vehicle is in motion must be clearly identified to users.

**1.4. Pending the addition of provisions within this Regulation for the equipment listed below, nothing in this Regulation shall prevent a Contracting Party from specifying requirements for vehicles to be registered in its territory for:**

**1.4.1 The fitting and technical requirements for route and destination display equipment:**

**1.4.2 The fitting and technical requirements for audible and visual display equipment.**

**1.5 Changes to the equipment listed in paragraph 1.4 shall not require a new type-approval to this Regulation.**

#### Justification

The manner in which a vehicle route and destination is specified is subject to national and in some cases regional variation. In the absence of a harmonised standard it is proposed that each contracting party be permitted to specify requirements that best suit its territory.

Audible and visual announcement systems are becoming more commonplace on public transport systems. In the absence of a harmonised standard it is proposed that each contracting party be permitted to specify requirements that best suit its territory.

## 2. DEFINITIONS

For the purpose of this Regulation:

2.1. "Vehicle" means a vehicle of category M2 or M3 within the scope defined by paragraph 1. above.

2.1.1. For vehicles having a capacity exceeding 22 passengers in addition to the driver, there are three classes of vehicles:

2.1.1.1. "Class I": vehicles constructed with areas for standing passengers, to allow frequent passenger movement.

2.1.1.2. "Class II": 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.

2.1.1.3. "Class III": vehicles constructed exclusively for the carriage of seated passengers.

- 2.1.1.4. A vehicle may be regarded as belonging in more than one Class. In such a case it may be approved for each Class to which it corresponds.
- 2.1.2. For vehicles having a capacity not exceeding 22 passengers in addition to the driver, there are two classes of vehicles:
- 2.1.2.1. "Class A": vehicles designed to carry standing passengers; a vehicle of this class has seats and shall have provision for standing passengers.
- 2.1.2.2. "Class B": vehicles not designed to carry standing passengers; a vehicle of this class has no provision for standing passengers.
- 2.1.3. "Articulated vehicle" means a vehicle which consists of two or more rigid sections which articulate relative to one another; the passenger compartments of each section intercommunicate so that passengers can move freely between them; the rigid sections are permanently connected so that they can only be separated by an operation involving facilities which are normally only found in a workshop;
- 2.1.3.1. "Double-decker articulated vehicle" means a vehicle which consists of two or more rigid sections which articulate relative to one another; the passenger compartments of each section intercommunicate on at least one deck so that passengers can move freely between them; the rigid sections are permanently connected so that they can only be separated by an operation involving facilities which are normally only found in a workshop.
- 2.1.4. "Low floor ~~bus~~ vehicle" is a vehicle of class I, II or A in which at least 35 per cent of the area available for standing passengers (or in its forward section in the case of articulated vehicles, or in its lower deck in the case of double-decker vehicles) forms an area without steps and includes access to at least one service door.
- 2.1.5. "Bodywork" means a separate technical unit comprising all the special internal and external equipment of the vehicle.
- 2.1.6. "Double deck vehicle" means a vehicle where the provided spaces for passengers are arranged, at least in one part, in two superimposed levels and spaces for standing passengers are not provided in the upper deck.
- 2.1.7. "Separate technical unit" means a device intended to be part of a vehicle, which may be type-approved separately but only in relation to one or more specified types of vehicle;
- 2.1.8. "Trolleybus" means a vehicle of classes I, II or III, electrically driven by energy from external wires.
- 2.2. "Definition of type(s)"
- 2.2.1. "Vehicle type" means vehicles which do not differ in the following essential aspects:

- a) bodywork manufacturer,
  - b) chassis manufacturer;
  - c) vehicle concept ( $> 22$  passengers or  $\leq 22$  passengers);
  - d) bodywork concept (single / double deck, articulated, low-floor);
  - e) bodywork type if the bodywork has been approved as a separate technical unit;
- 2.2.2. "Bodywork type" for the purposes of type-approval as a separate technical unit means a category of bodywork which do not essentially differ in the following aspects:
- a) bodywork manufacturer,
  - b) vehicle concept ( $> 22$  passengers or  $\leq 22$  passengers);
  - c) bodywork concept (single/ double deck, articulated, low-floor).
  - d) mass of the completely equipped vehicle bodywork, differing by 10 per cent.
  - e) specified types of vehicle on which the type of the bodywork can be installed.
- 2.3. "Approval of a vehicle or a separate technical unit" means the approval of a vehicle type, or of a bodywork type as defined in paragraph 2.2. with regard to the constructional features specified in this Regulation;
- 2.4. "Superstructure" means the part of the bodywork which contributes to the strength of the vehicle in the event of a roll-over accident;
- 2.5. "Service door" means a door intended for use by passengers in normal circumstances with the driver seated:
- 2.6. "Double door" means a door affording two, or the equivalent of two, access passages;
- 2.7. "Sliding door" means a door which can be opened or closed only by sliding it along one or more rectilinear or approximately rectilinear rails.
- 2.8. "Emergency door" means a door intended for use by passengers as an exit only exceptionally, and in particular in an emergency;
- 2.9. "Emergency window" means a window, not necessarily glazed, intended for use as an exit by passengers in an emergency only.
- 2.10. "Double or multiple window" means an emergency window which, when divided into two or more parts by imaginary vertical line(s) (or plane(s)), exhibits two or more parts respectively, each of which complies as to dimensions and access with the requirements applicable to a normal emergency window;

- 2.11. "Escape hatch" means an opening in the roof or the floor intended for use as an emergency exit by passengers in an emergency only;
- 2.12. "Emergency exit" means an emergency door, emergency window or escape hatch.
- 2.13. "Exit" means a service door, intercommunication staircase, half-staircase or emergency exit;
- 2.14. "Floor or deck" means that part of the bodywork whose upper surface supports standing passengers, the feet of seated passengers and the driver and any crew member, and may support the seat mountings;
- 2.15. "Gangway" means the space providing access by passengers from any seat or row of seats to any other seat or row of seats or to any access passage from or to any service door or intercommunication staircase and any area for standing passengers; it does not include:
- 2.15.1. the space extending 300 mm in front of any seat, except where a sideways-facing seat is situated above a wheel arch, in which case this dimension may be reduced to 225 mm (*see Annex 4, figure 25*).
- 2.15.2. the space above the surface of any step or *staircase (except where the surface of the step is contiguous with that of a gangway or access passage)*, or
- 2.15.3. any space which affords access solely to one seat or row of seats or a facing pair of transverse seats or row of seats.
- 2.16. "Access passage" means the space extending inwards into the vehicle from the service door up to the outermost edge of the upper step (edge of the gangway), intercommunication staircase or half-staircase. Where there is no step at the door, the space to be considered as access passage shall be that which is measured according to annex 3, paragraph 7.7.1. up to a distance of 300 mm from the starting position of the inner face of the *test gauge dual panel*.
- 2.17. "Driver's compartment" means the space intended for driver's exclusive use except in the case of an emergency and containing the driver's seat, the steering wheel, controls, instruments and other devices necessary for driving or operating the vehicle.
- 2.18. "Mass of the vehicle in running order" means the mass of the unladen vehicle with bodywork, and with coupling device in the case of a towing vehicle, in running order, or the mass of the chassis with cab if the manufacturer does not fit the bodywork and/or coupling device (including coolant, oils, 90 per cent fuel, 100 per cent other liquids except used waters, tools, spare wheel and driver (75 kg), and, for buses and coaches, the mass of the crew member (75 kg) if there is a crew seat in the vehicle.
- 2.19. "Technically permissible maximum laden mass (M)" means the maximum mass of the vehicle based on its construction and performance, stated by the manufacturer. The technically permissible maximum laden mass is used to determine the vehicle category.

- 2.20. "Passenger" means a person, other than the driver or a member of the crew;
- 2.21. "Passenger with reduced mobility" means all passengers who have a difficulty when using public transport, such as disabled people (including people with sensory and intellectual impairments, and wheelchair users, people with limb impairments, people of small stature, people with heavy luggage, elderly people, pregnant women, people with shopping trolleys, and people with children (including children seated in pushchairs).
- 2.22. "Wheelchair user" means a person who due to infirmity or disability uses a wheelchair for mobility.
- 2.23. "Member of the crew" means a person assigned to operate as a co-driver or the possible assistant.
- 2.24. "Passenger compartment" means a space intended for passengers' use excluding any space occupied by fixed appliances such as bars, kitchenettes, toilets or baggage/goods compartments.
- 2.25. "Power-operated service door" means a service door which is operated exclusively by energy other than muscular energy and the opening and closing of which, if not automatically operated, is remotely controlled by the driver or a member of the crew.
- 2.26. "Automatically-operated service-door" means a power-operated service door which can be opened (other than by means of emergency controls) only after a control is operated by a passenger and after activation of the controls by the driver, and which closes again automatically.
- 2.27. "Starting prevention device" means a device which prevents the vehicle being driven away from rest *when a door is not fully closed*;
- 2.28. "Driver operated service door" means a service door which normally is opened and closed by the driver.
- 2.29. "Priority seat" means a seat with additional space for a passenger with reduced mobility and marked accordingly.
- 2.30. "Boarding device" means a device to facilitate wheelchair access to vehicles, such as lifts, ramps, etc.
- 2.31. "Kneeling system" means a system which lowers and lifts totally or partially the body of a vehicle relative to the normal position of travel.
- 2.32. "Lift" means a device or system with a platform that can be raised and lowered to provide passenger access between the floor of a passenger compartment and the ground or kerb.
- 2.33. "Ramp" means a device to bridge the gap between the floor of a passenger compartment and the ground or kerb. **In its position for use, it includes any**

**surface that may move as part of the ramp deployment or be available for use only when the ramp is in the deployed position and over which a wheelchair is intended to travel.**

#### Justification

With a variety of ramp designs on the market there can be some confusion as to what parts of the vehicle must meet the ramp requirements. This proposal aims to remove such confusion.

- 2.34. "Portable ramp" means a ramp that may be detached from the vehicle structure and capable of being deployed by a driver or crew member.
- 2.35. "Demountable seat" means a seat that can be easily detached from the vehicle.
- 2.36. "Front" and "rear" means the front or rear of the vehicle according to the normal direction of travel and the terms; "forward", "foremost", "rearward" and "rearmost" etc. shall be construed accordingly.
- 2.37. "Intercommunication staircase" means a staircase which allows communication between the upper and lower decks.
- 2.38. "Separate compartment" means a space in the vehicle which may be occupied by passengers or crew ~~when the vehicle is in use~~ and which is separated from any other passenger or crew space, except where any partition allows passengers to see into the next passenger space, and is connected by a gangway without doors.
- 2.39. "Half staircase" is a staircase from the upper deck which terminates in an emergency door.

#### 5. REQUIREMENTS

- 5.1 All vehicles shall comply with the provisions set out in annex 3 to this Regulation. ~~(modified by annex 9 in the case of double deck vehicles)~~. Bodywork approved separately shall comply with annex ~~5 and/or~~ 10 ~~as appropriate~~. The approval of a vehicle incorporating a bodywork approved in accordance with annex 10 shall be completed in accordance with that annex.
- 5.2 Vehicles of Class I shall be accessible for people with reduced mobility, including **at least one** wheelchair users, according to the technical provisions laid down in annex 8.
- 5.3 Contracting Parties shall be free to choose the most appropriate solution to achieve improved accessibility in vehicles other than those of Class I. However, if vehicles other than those of Class I are equipped with **features or** devices for people with reduced mobility and/or wheelchair users, **they those features or devices** shall comply with the relevant requirements of annex 8.

#### Justification

This proposal aims to clarify the extent to which the requirements of annex 8 apply to vehicles.

- 5.4 Nothing in this Regulation shall prevent the national authorities of a Contracting Party from specifying that certain types of operation are reserved for vehicles which are equipped for the transport of passengers with reduced mobility in accordance with annex 8.

### Annex 3

#### REQUIREMENTS TO BE MET BY ALL VEHICLES

- 1.-6. (reserved)

#### 7. REQUIREMENTS

##### 7.1 General

- 7.1.1. Unless otherwise stated, all measurements shall be made when the vehicle is at its mass in running order and it is standing on a smooth and horizontal ground surface and in the normal condition for travel. If a kneeling system is fitted, it shall be set so the vehicle is at its normal ride height for travel. In the case of approval of bodywork as a separate technical unit the position of the body relative to the flat horizontal surface shall be specified by the manufacturer.

- 7.1.2. Wherever there is a requirement in this Regulation for a surface in the vehicle to be horizontal or at a specific angle when the vehicle is at its mass in running order, in the case of a vehicle with mechanical suspension, the surface may exceed this slope or possess a slope when the vehicle is at its mass in running order, provided that this requirement is met when the vehicle is in the loading condition declared by the manufacturer. If a kneeling system is fitted to the vehicle, it shall not be in operation.

##### 7.2. Masses and dimensions

- 7.2.1. The vehicles shall comply with the requirements of annex 11.

##### 7.2.2. Area available for passengers

- 7.2.2.1. The total surface area  $S_0$  available for passengers is calculated by deducting from the total area of the floor of the vehicle:

- 7.2.2.1.1. the area of the driver's compartment;

- 7.2.2.1.2. the area of steps at doors and the area of any other step with a depth of less than 300mm and the area swept by the door and its mechanism when it is operated;

- 7.2.2.1.3. the area of any part over which the vertical clearance is less than 1350mm measured from the floor disregarding permitted intrusion specified in paragraphs 7.7.8.6.3. and 7.7.8.6.4. In the case of vehicles of Class A or B, this dimension may be reduced to 1200mm;



- 7.2.2.1.4. the area of any part of the vehicle to which access by passengers is prevented as defined in paragraph 7.9.4.;
- 7.2.2.1.5. the area of any space reserved solely for the carriage of goods or baggage and from which passengers are excluded.
- 7.2.2.1.6. the area required to provide a clear working area at serveries;
- 7.2.2.1.7. the floor area occupied by any staircase, half staircase, intercommunication staircase of the surface of any step.
- 7.2.2.2. The surface area  $S_1$  available for standing passengers is calculated by deducting from  $S_0$ :
- 7.2.2.2.1. the area of all parts of the floor in which the slope exceeds the maximum permissible values as determined in paragraph 7.7.6.;
- 7.2.2.2.2. the area of all parts which are not accessible to standing passengers when all the seats are occupied, with the exception of folding seats;
- 7.2.2.2.3. the area of all parts where the clear height above the floor is less than the gangway height specified in paragraph 7.7.5.1. (handholds shall not be taken into account in this connection);
- 7.2.2.2.4. the area forward of the transverse vertical plane passing through the centre of the seating surface of the driver's seat (in its rearmost position).
- 7.2.2.2.5. the area 300mm in front of all seats other than folding seats, except where a sideways-facing seat is situated above the wheel arch, in which case this dimension may be reduced to 225mm. In the case of variable seating arrangements, of any seat when considered to be in use, see paragraph 7.2.2.4.
- 7.2.2.2.6. any surface not being excluded by the provisions in paragraph 7.2.2.2.1. to 7.2.2.2.5. above, on which it is not possible to place a rectangle of 400mm x 300mm;
- 7.2.2.2.7. in vehicles of Class II, the area in which standing is not allowed. **IN VEHICLES OF CLASS II, WHERE, DUE TO THE ADDITION OF A WHEELCHAIR SPACE(S), THE AREA ON WHICH PASSENGERS COULD STAND, EXCLUDING THE GANGWAY, EXCEEDS THE SPACE PROVIDED FOR TWO DOUBLE SEATS, NOTHING IN THIS REGULATION PREVENTS ANY SUCH WHEELCHAIR SPACE FROM BEING RESTRICTED TO AN EXCLUSIVE USE BY WHEELCHAIR USERS. THESE AREAS SHALL BE CONSIDERED AS AREAS IN WHICH STANDING IS NOT ALLOWED.**

#### JUSTIFICATION

THIS PROPOSAL SEEKS TO ENSURE THAT A CLASS II VEHICLE, THROUGH THE ADDITION OF A WHEELCHAIR SPACE, IS NOT NECESSARILY RECLASSIFIED AS A CLASS I VEHICLE.

- 7.2.2.2.8. in double deck vehicles, any area of the upper deck.
- 7.2.2.2.9. the surface of the wheelchair space(s) when considered occupied by a wheelchair user(s), see paragraph 7.2.2.4.
- 7.2.2.3. There shall be on the vehicle a number (P) of seating places, other than folding seats, which conform to the requirements of paragraph 7.7.8. If the vehicle is of Class I, II or A the number of seating places on each deck shall be at least equal to the number of square meters of floor on that deck available for passengers and crew (if any) rounded down to the nearest whole number; this number may, in vehicles of Class I, excluding the upper deck, be reduced by 10 per cent.
- 7.2.2.4. In the case of a vehicle equipped with a variable seating capacity the area available for standing passengers (S<sub>1</sub>) and the provisions of paragraph 7.2.3. shall be determined for each of the following conditions as applicable;
- 7.2.2.4.1. with all possible seats occupied followed by the remaining area for standing passengers and, if space remains, any wheelchair spaces occupied;
- 7.2.2.4.2. with all possible standing areas occupied followed by the remaining seats available for seated passengers and, if space remains, any wheelchair spaces occupied;
- 7.2.2.4.3. with all possible wheelchair spaces occupied followed by the remaining area for standing passengers and then the remaining seats available for use occupied.
- 7.2.3. Marking of vehicles.
- 7.2.3.1. The vehicle shall be clearly marked in a manner visible on the inside in the vicinity of the front door in letters or pictograms not less than 15 mm high and numbers not less than 25 mm high, with:
- 7.2.3.1.1. the maximum number of seating places the vehicle is designed to carry;
- 7.2.3.1.2. the maximum number of standing places, if any, the vehicle is designed to carry;
- 7.2.3.1.3. the maximum number of wheelchairs which the vehicle is designed to carry, if any.
- 7.2.3.2. *(Reserved) If a vehicle is designed to have a variable number of seating places, area available for standing passengers or number of wheelchairs carried, the requirements of paragraph 7.2.3.1. shall apply to each maximum seating capacity and the corresponding number of wheelchairs and standing passengers as appropriate.*

7.2.3.3. Space shall be provided in the driver's area, in a position clearly visible to the driver, in letters or pictograms not less than 10 mm high and numbers not less than 12 mm high, with:

7.2.3.3.1. the mass of baggage which may be carried when the vehicle is loaded with the maximum numbers of passengers and crew and the vehicle is not exceeding the technically permissible maximum mass, or the permissible mass of any axle. This shall include the mass of baggage:

7.2.3.3.1.1. in baggage compartments (mass B, paragraph 7.4.3.3.1. of annex 11);

7.2.3.3.1.2. on the roof if equipped for the carriage of baggage (mass BX, paragraph 7.4.3.3.1. of annex 11).

7.7.6. Slope of gangway

The slope of the gangway, ~~measured with the vehicle unladen on a horizontal surface, and with the kneeling system not activated,~~ shall not exceed:

7.7.6.1. *in the longitudinal direction:*

7.7.6.1.1. 8 per cent in the case of a vehicle of Class I, II or A, or

7.7.6.1.2. 12.5 percent in the case of a vehicle of Class III and B, and

7.7.6.2. *In the transversal direction, 5 percent for all classes. ~~in the case of the plane perpendicular to the longitudinal axis of symmetry of vehicle.~~*

~~7.7.6.1. 8 per cent in the case of a vehicle of Class I, II or A, or~~

~~7.7.6.2. (reserved)~~

~~7.7.6.3 12.5 percent in the case of a vehicle of Class III and B, and~~

~~7.7.6.4. 5 percent in the case of the plane perpendicular to the longitudinal axis of symmetry of vehicle.~~

7.7.8. Passenger seats (including folding seats) and space for seated passengers

7.7.8.1. Minimum seat width (see Annex 4, figure 9)

7.7.8.1.1. The minimum width of the seat cushion, dimension F (annex 4, figure 9), measured from a vertical plane passing through the centre of that seating position, shall be:

|                   |         |
|-------------------|---------|
| Class I, II, A, B | 200 mm. |
| Class III         | 225 mm. |

7.7.8.1.2. The minimum width of the available space for each seating position, dimension G (annex 4, figure 9), measured from a vertical plane passing through the centre of that seating position at height between 270 mm and 650 mm above the uncompressed seat cushion, shall be not less than:

|   |         |
|---|---------|
| individual seats:                                   | 250 mm  |
| continuous rows of seats for two or more passengers | 225 mm. |

7.7.8.1.3. For vehicles 2.35 m in width or less, the width of the available space for each seating position, measured from a vertical plane passing through the centre of that seating position at heights between 270 mm and 650 mm above the uncompressed seat cushion shall be 200 mm (see annex 4, figure 9A). In case of compliance with this paragraph the requirements of paragraph 7.7.8.1.2. shall not apply.

7.7.8.1.4. For vehicles having a capacity not exceeding 22 passengers, in the case of seats adjacent to the wall of the vehicle, the available space does not include, in its upper part, a triangular area 20 mm wide by 100 mm high (see annex 4, figure 10). In addition, the space needed for safety belts and their anchorages and for the sun visor should be considered as exempted.

7.7.8.1.5. *In measuring the gangway width, no account shall be taken of whether or not the available space defined above protrudes into the gangway.*

7.7.8.2. Minimum depth of seat cushion (dimension K, see annex 4, figure 11)

The minimum depth of a seat cushion shall be:

7.7.8.2.1. 350 mm in vehicles of Classes I, A and B, and

7.7.8.2.2. 400 mm in vehicles of Class II and Class III.

7.7.8.3. Height of seat cushion (dimension H, see annex 4, figure 11a)

The height of the uncompressed seat cushion relative to the floor shall be such that the distance from the floor to a horizontal plane tangential to the front upper surface of the seat cushion is between 400 mm and 500 mm: this height may however be reduced to not less than 350 mm at the wheel arches (*taking into account the allowances permitted in paragraph 7.7.8.6.2*) and at the engine/transmission compartment.

7.7.8.4. Seat spacing (see annex 4, figure 12)

7.7.8.4.1. In the case of seats facing in the same direction, the distance between the front of a seat squab and the back of the squab of the seat preceding it (dimension H), shall, when measured horizontally and at all heights above the floor between the level of the top surface of the seat cushion and a point 620 mm above the floor, not be less than:

| H                |        |
|------------------|--------|
| Class I, A and B | 650 mm |
| Class II and III | 680 mm |

- 7.7.8.4.2. All measurements shall be taken, with the seat cushion and squab uncompressed, in a vertical plane passing through the centreline of the individual seating place.
- 7.7.8.4.3. Where transverse seats face one another the minimum distance between the front faces of the seat squabs of facing seats, as measured across the highest points of the seat cushions, shall be not less than 1300 mm.
- 7.7.8.4.4. Measurements shall be taken with reclining passenger seats and adjustable driving seats with their seat backs and other seat adjustments in the normal position of use specified by the manufacturer.
- 7.7.8.4.5. Measurements shall be taken with any folding table fitted to a seat back in the folded (*stowed*) position.
- 7.7.8.4.6. Seats which are mounted on a track or other system which permits the operator or the user to easily vary the interior configuration of the vehicle shall be measured in the normal position of use specified by the manufacturer in the application for approval.
- 7.7.8.5. Space for seated passengers (see annex 4, figure 13)
- 7.7.8.5.1. *For a seat behind a partition or other rigid structure other than a seat, a A minimum clear space in front of each required passenger seating space (as defined in paragraph 7.7.8.6.) seat shall be provided as shown in annex 4, figure 13. ~~The seat-back of another preceding seat or a~~ A partition whose contour corresponds approximately to that of the inclined seat back may intrude into this space as provided by paragraph 7.7.8.4.6. ~~The local presence in this space of seat legs shall also be permitted provided that adequate space remains for the passenger's feet.~~ In the case of seats alongside the driver's seat in vehicles of Class A or B with up to 22 passengers, intrusion of the dashboard, instrument panel, gear change control, windscreen, sun visor, seat belts and seat belt anchorages shall be allowed.*
- 7.7.8.5.2. *For a seat behind a seat and/or a seat facing the gangway, a minimum clear foot space of at least 300 mm depth and a width according to paragraph 7.7.8.1.1., shall be provided as shown in Annex 4, figure 11b. The local presence in this space of seat legs, passenger footrests and of intrusions as provided by paragraph 7.7.8.6. shall be permitted provided that adequate space remains for the passengers' feet. This foot space may partly be situated in and/or above the gangway but shall not create any obstruction when measuring the minimum gangway-width in accordance with paragraph 7.7.5. In the case of seats alongside the driver's seat in vehicles of Class A or B, intrusion of the seat belts and seat belt anchorages shall be allowed.*
- 7.7.8.5.3.2. **THE MINIMUM NUMBER OF PRIORITY SEATS SHALL BE [FOUR] IN CLASS I, TWO IN CLASS II AND ONE IN CLASS A. IF PRIORITY SEATS ARE TO BE FITTED IN**

**VEHICLES OF CLASS III, THERE SHALL BE AT LEAST TWO. IF PRIORITY SEATS ARE TO BE FITTED IN VEHICLES OF CLASS B, THERE SHALL BE AT LEAST ONE. A SEAT THAT FOLDS OUT OF THE WAY WHEN NOT IN USE SHALL NOT BE DESIGNATED AS A PRIORITY SEAT.**

~~HOWEVER, AT LEAST TWO IN CLASS I AND CLASS II AND ONE IN CLASS A FORWARD OR REARWARD FACING SEATS SPECIFICALLY INTENDED AND MARKED FOR PASSENGERS WITH REDUCED MOBILITY OTHER THAN WHEELCHAIR USERS SHALL BE PROVIDED IN THAT PART OF THE BUS WHICH IS MOST SUITABLE FOR BOARDING. THESE SEATS SHALL BE DESIGNED FOR PASSENGERS WITH REDUCED MOBILITY SO AS TO PROVIDE ENOUGH SPACE, SHALL HAVE SUITABLY DESIGNED AND PLACED HANDHOLDS TO FACILITATE ENTRY AND EXIT OF THE SEAT AND PROVIDE COMMUNICATION IN ACCORDANCE WITH PARAGRAPH 7.7.9. FROM THE SEATED POSITION.~~

~~7.7.8.5.3.1 THESE SEATS SHALL PROVIDE AT LEAST 110 PERCENT OF THE SPACE SPECIFIED IN PARAGRAPH 7.7.8.5.1.~~

#### JUSTIFICATION

THIS PROPOSAL SEEKS TO ENSURE THAT THERE IS ONLY ONE DEFINITION OF PRIORITY SEAT AND SPECIFIES THE MINIMUM NUMBER REQUIRED IN EACH VEHICLE CATEGORY.

#### 7.7.9. Communication with the driver

7.7.9.1. On vehicles of Classes I, II and A, a means shall be provided to enable passengers to signal to the driver that she/he should stop the vehicle. The controls for all such communication devices shall **be capable of operation with the palm of the hand, have protruding buttons, in vehicles of Class I and A no more than 1500mm from the floor, and shall be a contrasting colour or colours. There shall be appropriate communication devices distributed adequately and evenly throughout the vehicle and no more than 1500mm from the floor; this does not exclude the possibility of installing higher additional communication devices. Controls shall be a contrasting colour or colours. Controls shall be distributed adequately and evenly throughout the vehicle.** Activation of the control shall also be indicated to the passengers by means of one or more illuminated signs. The sign shall display the words "bus stopping" or equivalent, and/or a suitable pictogram and shall remain illuminated until the service door(s) open. Articulated vehicles shall have such signs in each rigid section of the vehicle. Double-deck vehicles shall have them on each deck. *The provisions of paragraph 7.6.11.4. apply to any textual markings used.*

#### Justification

This clarifies the requirements regarding additional communication devices that may be fitted in addition to those required by Regulation.

#### 7.7.9.2. Communication with the crew compartment

If a crew compartment is fitted without access to the driver or passenger compartments, a means of communication between the driver and this crew compartment shall be provided.

7.7.9.3. Communication with the toilet compartment

*Toilet compartments shall be fitted with a means of summoning assistance in an emergency.*

7.8. Artificial interior lighting

7.8.1. Internal electrical lighting shall be provided for the illumination of:

7.8.1.1. all passenger compartments, crew compartments, toilet compartments and the articulated section of an articulated vehicle;

7.8.1.2. any step or steps;

7.8.1.3. the access to any exits and the area immediately around the service door(s) **including, when in use, any boarding device fitted;**

7.8.1.4. the internal markings and internal controls of all exits;

7.8.1.5. all places where there are obstacles.

7.8.2. There shall be at least two internal lighting circuits such that failure of one will not affect the other. A circuit serving only permanent entry and exit lighting can be considered as one of these circuits.

7.8.3. Provisions shall be made to protect the driver from the effects of glare and reflections caused by artificial interior lighting. **Any lighting likely to affect adversely the driver's vision shall operate only while the vehicle is at rest.**

7.8.4. *Individual lights for each of the items in paragraph 7.8.1 are not required providing adequate illumination can be maintained during normal use.*

7.8.5. *Control of the mandatory interior lighting shall be by manual switches under the control of the driver or automatically controlled.*

Justification

**This proposal ensures that sufficient light is provided for the safe use of boarding devices without affecting the driver's vision.**

~~7.11.4~~ ~~Handrails to priority seating. (Reserved)~~

~~7.11.4.1 A handrail at a height of between 800 mm and 900 mm above the floor level shall be provided between the priority seats as described in paragraph 7.7.8.5.2. and the 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 1050 mm and a vertical handrail shall be provided on at least one side of the break.~~

### Justification

Moved to Annex 8 which now contains all technical requirements for priority seats, including handrails leading to them.

### Annex 8

#### REQUIREMENTS FOR TECHNICAL DEVICES FACILITATING ACCESS FOR PASSENGERS OF REDUCED MOBILITY

##### 1. GENERAL

This annex contains the provisions which apply to a vehicle designed for easy access for passengers with reduced mobility and wheelchair users.

##### 2. SCOPE

These requirements shall apply to vehicles permitting easier access for persons with reduced mobility.

##### 3. REQUIREMENTS-

##### 3.1. Steps

The height of the first step from the ground of at least one service door shall not exceed 250 mm for vehicles of Class I and A and 320 mm for vehicles of class II, III and B. *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.*

As an alternative for vehicles of Class I and A, 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.

*The height of steps in an access passage ~~The height of the steps other than the first step from the ground~~ at the above-mentioned door(s), ~~in access passage(s)~~ and in the a gangway, shall be not more than 200 mm for vehicles of Class I and A and 250 mm for vehicles of Class II, III and B.*

The transition from a sunken gangway to a seating area shall not be considered to be a step.



3.2. Priority seats and space for passengers with reduced mobility

3.2.1. (RESERVED.)

~~A MINIMUM NUMBER OF FORWARD OR REARWARD FACING SEATS DESIGNATED AS PRIORITY SEATS FOR DISABLED PASSENGERS SHALL BE SITUATED IN A POSITION NEAR TO A SERVICE DOOR(S) SUITABLE FOR BOARDING AND ALIGHTING. THE MINIMUM NUMBER OF PRIORITY SEATS SHALL BE FOUR IN CLASS I, TWO IN CLASS II AND CLASS III AND ONE IN CLASS A AND B. A SEAT THAT FOLDS OUT OF THE WAY WHEN NOT IN USE SHALL NOT BE DESIGNATED AS A PRIORITY SEAT. PARAGRAPH 7.7.8.5.2. OF ANNEX 3 SHALL NOT APPLY TO VEHICLES THAT COMPLY WITH THIS REQUIREMENT.~~

JUSTIFICATION

THE ADHOC GROUP AGREED THAT IT WOULD BE MORE APPROPRIATE TO CONTAIN THE REQUIREMENTS FOR PRIORITY SEATS IN ANNEX 3. PARA 3.2.1 IS THEREFORE RESERVED AND THE REQUIREMENTS CONTAINED IN ANNEX 3 PARA 7.7.8.5.3

3.2.2. There shall be adequate space under, or adjacent to, at least one of the priority seats for a guide dog.

3.2.3. 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. *In the case of seats facing each other one of the gangway seats may alternatively be fitted with a vertical stanchion. This stanchion shall be positioned such that the seat occupant is kept securely on the seat and easy access to the seat is possible.*

~~Handrails or handholds shall be fitted adjacent to priority seats in such a way as to allow the passenger to grasp them easily.~~

Justification

Moved to paragraph 3.4 with other handrail requirements.

3.2.4. 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. ~~or, in the case of a continuous seat, 220 mm per seating position on each side.~~

3.2.5. 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.

3.2.6. 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.

3.2.7. *Each priority seating position shall have a free height of not less than 1300 mm for vehicles of Class I and A 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. Intrusion of a seat back or other object 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 1200 mm in height this space shall be 300 mm. From the edges of the free space defined above, intrusions are permitted in accordance with paragraphs 7.7.8.6.3.1. to 7.7.8.6.3.4. of annex 3 as if reference to the clear space in paragraphs 7.7.8.6.1. and 7.7.8.6.2. of annex 3 is a reference to the clear space defined above. The provisions of paragraph 7.7.8.1.4. of annex 3 may apply. Intrusions of handholds or handrails as mentioned in the second sub-paragraph of paragraph 3.2.3.4 may protrude by a maximum of 100 mm from the sidewall into the clear space over the vertical projection of the foot space.*

**3.2.8** **Vehicles fitted with priority seats shall have pictograms in accordance with annex 4, figure 23B placed internally adjacent to each priority seat or group of seats.**

Justification

In order that passengers can readily identify a priority seat the requirement for a suitable pictogram is added.

3.3. Communication devices

3.3.1. 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 1200 mm above the floor.

3.3.2. Communication devices situated in the low floor area shall be at a height between 800 mm and 1500 mm where there are no seats.

3.3.3. **(Reserved)**

~~The control for all internal communication devices shall be capable of operation with the palm of the hand, and shall be in a contrasting colour or colours and tone.~~

Justification

This requirement moved to Annex 3.

3.3.4. 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 ~~not higher than~~ 1 300 mm from the ground. This requirement shall not apply to a door situated in the direct field of vision of the driver.*

3.4. **Pictograms Handrails to priority seating.**

~~3.4.1. Vehicles fitted with a wheelchair space and/or priority seats shall have pictograms in accordance with annex 4, figure 23A visible from the outside, both on the front~~

~~nearside of the vehicle and adjacent to the relevant service door(s). Appropriate pictograms will also be placed internally adjacent to the wheelchair space or to the priority seat. A handrail at a height of between 800 mm and 900 mm above the floor level shall be provided between the priority seats as described in paragraph 7.7.8.5.3 of Annex 3, and the 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 1050 mm and a vertical handrail shall be provided on at least one side of the break.~~

**3.4.2 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.**

Justification

Annex 8 now contains all technical requirements for priority seats, including handrails.

3.5. 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 non-slip slip resistant surface.

Justification

Ensures consistancy of terminology.

3.6. Wheelchair accommodation provisions

3.6.1. 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 and the floor surface of the special area shall be slip resistant.

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 annex 4, figure ~~23~~ **22**.

3.6.2. 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 **aid device** complying with the provisions of ~~paragraph 3.11.2. (a kneeling system) of this annex; this shall be in combination with the provisions of~~ paragraph 3.11.3. (a lift) or 3.11.4. (a ramp) of this annex.

Justification

This proposal recognises that for some vehicles a kneeling system shall not be necessary.

- 3.6.3. A door for wheelchair access, that is not a service door, shall have a minimum height of 1400 mm. The minimum width of all doors providing wheelchair access to the vehicle shall be 900 mm which may be reduced by 100 mm when the measurement is made at the level of handholds.
- 3.6.4. It shall be possible to move from the outside of the vehicle through at least one of the doors for wheelchair access into the special area(s) with a reference wheelchair of the dimensions shown in annex 4, figure 21.
- 3.6.4.1 IN THE CASE OF VEHICLES OF CLASS A, I [OR II] FITTED WITH MORE THAN ONE WHEELCHAIR SPACE THIS TEST SHALL BE COMPLETED FOR EACH WHEELCHAIR SPACE WITH ALL OTHER WHEELCHAIR SPACES OCCUPIED BY THE REFERENCE WHEELCHAIR.**
- 3.6.5 IN VEHICLES FITTED WITH A RAMP FOR WHEELCHAIR ACCESS, IT SHALL BE POSSIBLE FOR A REFERENCE WHEELCHAIR HAVING THE DIMENSIONS SHOWN IN ANNEX 4, FIGURE 21 TO ENTER AND EXIT A VEHICLE WITH THE WHEELCHAIR MOVING IN A FORWARD DIRECTION.**

#### JUSTIFICATION

THIS PROPOSAL CLARIFIES THE REQUIREMENT FOR INTERNAL MANOEUVRING SPACE FOR VEHICLES FITTED WITH MORE THAN ONE WHEELCHAIR SPACE. IT ALSO IMPROVES THE SAFETY OF A WHEELCHAIR USER BOARDING AND ALIGHTING BY ENSURING THAT THEY ARE ALWAYS ABLE TO TRAVERSE A RAMP IN A FORWARDS DIRECTION.

- ~~3.6.6-3.4.1.~~ Vehicles fitted with a wheelchair space ~~and/or priority seats~~ shall have pictogram(s) in accordance with annex 4, figure 23A visible from the outside, both on the front nearside of the vehicle and adjacent to the relevant service door(s). ~~Appropriate A pictogram shall will also~~ be placed internally adjacent to the wheelchair space ~~or to the priority seat.~~

#### Justification

This paragraph is moved within the text from 3.4.1 to 3.6.6 and the pictogram requirements for priority seating are detailed separately within paragraph 3.2.8

- 3.7. Seats AND STANDING PASSENGERS in the wheelchair space
- 3.7.1. Folding seats may be fitted in a wheelchair space. However, such seats when folded and out of use shall not intrude into the wheelchair space.
- 3.7.2. 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.

- 3.7.3. **For vehicles of Class I, II and A, ~~W~~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 a signs fixed on or adjacent to them with the following text, **equivalent text or pictogram**:

"Please give up this space for a wheelchair user".

**A change of language shall not require a new type-approval to this Regulation.**

- 3.7.4. **IN VEHICLES WHERE ANY WHEELCHAIR SPACE IS INTENDED FOR USE EXCLUSIVELY BY A WHEELCHAIR USER AS PROVIDED FOR IN PARAGRAPH 7.2.2.2.7. OF ANNEX 3, THOSE SPACES SHALL BE CLEARLY MARKED WITH THE FOLLOWING TEXT, EQUIVALENT TEXT OR PICTOGRAM:**

**"AREA INTENDED FOR USE EXCLUSIVELY BY A WHEELCHAIR USER"**

**A CHANGE OF LANGUAGE DOES NOT REQUIRE A NEW TYPE APPROVAL.**

#### JUSTIFICATION

THIS PROPOSAL SEEKS TO ENSURE THAT A CLASS II VEHICLE, THROUGH THE ADDITION OF A WHEELCHAIR SPACE, IS NOT NECESSARILY RECLASSIFIED AS A CLASS I VEHICLE.

- 3.8. **Stability of wheelchairs**

- 3.8.1. **Wheelchair restraint system** *In vehicles required to have occupant restraint systems fitted, the wheelchair space shall be designed for the wheelchair user to travel facing forwards and shall be fitted with ~~wheelchair and wheelchair user~~ restraint systems complying with **the requirements specified in paragraphs 3.8.1.2. or 3.8.2. or 3.8.3.***

*In vehicles not required to have occupant restraint systems fitted, the wheelchair space shall be fitted with restraint systems **complying with the requirements specified in paragraph 3.8.1.1. or 3.8.3. 3.8.2., 3.8.3. or 3.8.4.***

*As an alternative to the requirements contained in paragraphs 3.8.1.1 to 3.8.1.2.3, restraint systems may comply with the requirements contained in paragraphs 3.8.2 to 3.8.2.11.*

- 3.8.1.1.** **In a vehicle where passenger seats are not required to be fitted with any kind of occupant restraint system, the wheelchair space shall be fitted with a restraint system in order to warrant the stability of the wheelchair;**

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

- a) a force of 250 daN  $\pm$  20 daN per wheelchair shall be applied on the restraint system itself;
- b) the force shall be applied 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°  $\pm$  10° to the horizontal plane and towards the front of the vehicle;
- e) the force shall be maintained for a period of not less than 1.5 seconds;
- d) 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.

#### Justification

Paragraph 3.8.1.1. permits a wheelchair user to travel in a vehicle forward facing with the wheelchair secured but with no restraint system for the wheelchair user. A wheelchair user is less likely to be able to hold themselves in their seat compared to any other passenger in the vehicle. Furthermore, other passengers will usually have another seat in front of them whereas the nature of a wheelchair space is that there will be a large clear space in front of a wheelchair user and as a consequence there is a greater risk of injury if thrown from their seat. It is recommended that this paragraph be deleted such that any unrestrained wheelchair user must travel facing the rear of the vehicle or must be provided with a wheelchair and wheelchair user restraint system in accordance with paragraph 3.8.2. or 3.8.3. Paragraph numbers are amended to help separate and clarify the different technical requirements.

3.8.1.2.3.8.2. When passenger seats are required **to be fitted** with occupant restraint systems, each wheelchair space shall be provided with a restraint system capable of restraining the wheelchair and its occupant the wheelchair user.

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.

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

- 3.8.2.1.1 a) the forces referred hereto shall be applied in forward and rearward directions, separately and on the restraint system itself;
- 3.8.2.1.2 b) the force shall be maintained for a period of not less than 0.2 seconds;
- 3.8.2.1.3 e) 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.

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

3.8.1.2.1.1.2.1 For category M<sub>2</sub>:

3.8.2.2.1.1 a) 1110 daN ± 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° to the horizontal plane of the vehicle and towards the front of the vehicle;

3.8.2.2.1.2 b) 675 daN ± 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 daN ± 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;

3.8.2.2.1.3 c) 1715 daN ± 20 daN in an angle of 45° ± 10° to the horizontal plane of the vehicle and towards the front of the vehicle on the wheelchair restraint system;

3.8.2.2.1.4 d) the forces shall be applied simultaneously.

3.8.1.2.1.2.2. For category M<sub>3</sub>:

3.8.2.2.2.1 a) 740 daN ± 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° to the horizontal plane of the vehicle and towards the front of the vehicle;

3.8.2.2.2.2 b) 450 daN ± 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 daN ± 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;

3.8.2.2.2.3 c) 1130 daN ± 20 daN in an angle of 45° ± 10° to the horizontal plane of the vehicle and towards the front of the vehicle on the wheelchair restraint system;

3.8.2.2.2.4 d) the forces shall be applied simultaneously.

3.8.1.2.2.3. In forward direction in the case of a combined wheelchair and wheelchair user restraint system.

3.8.2.3.1

~~3.8.1.2.2.3.1.~~ For category M<sub>2</sub>;

3.8.2.3.1.1 a) 1110 daN ± 20 daN in an angle of 45° ± 10° 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;

3.8.2.3.1.2 b) 675 daN ± 20 daN in an angle of 45° ± 10° to the horizontal plane of the vehicle and towards the front of the vehicle on the lap portion of the belt and 675 daN ± 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;

3.8.2.3.1.3 e) 1715 daN ± 20 daN in an angle of 45° ± 10° to the horizontal plane of the vehicle and towards the front of the vehicle on the wheelchair restraint system;

3.8.2.3.1.4 d) the forces shall be applied simultaneously.

~~3.8.1.2.2.3.2.~~ For category M<sub>3</sub>:

3.8.2.3.2.1. a) 740 daN ± 20 daN in an angle of 45° ± 10° 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;

3.8.2.3.2.2. b) 450 daN ± 20 daN in an angle of 45° ± 10° to the horizontal plane of the vehicle and towards the front of the vehicle on the lap portion of the belt and 450 daN ± 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;

3.8.2.3.2.3. e) 1130 daN ± 20 daN in an angle of 45° ± 10° to the horizontal plane of the vehicle and towards the front of the vehicle on the wheelchair restraint system;

3.8.2.3.2.4. d) the forces shall be applied simultaneously.

~~3.8.1.2.3.4.~~ In rearward direction:

3.8.2.4.1. a) 810 daN ± 20 daN in an angle of 45° ± 10° to the horizontal plane of the vehicle and towards the rear of the vehicle on the wheelchair restraint system.

3.8.2.5. **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 Regulation No. 14.**

Justification



The performance of the anchorages for the wheelchair user restraint system will be influenced by the direction and distribution of the applied forces. This amendment specifies the same device as that intended for the testing of seat belt anchorages in accordance with Regulation No. 14.

- 3.8.2.3. Alternative wheelchair restraint system:
- 3.8.2.3.1. 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;
- 3.8.2.3.2. 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 Regulation No. 16;
- 3.8.2.3.3. Any restraint system fitted to a wheelchair space shall be capable of being easily released in the case of an emergency;
- 3.8.2.3.4. Any wheelchair restraint system shall either:
- 3.8.2.3.4.1. meet the dynamic test requirements described in paragraph 3.8.2.3.8. and be securely attached to vehicle anchorages meeting the static test requirements in paragraph 3.8.2.3.6.; or
- 3.8.2.3.4.2. be securely attached to vehicle anchorages such that the combination of restraint and anchorages meets the requirements of paragraph 3.8.2.3.8.
- 3.8.2.3.5. Any wheelchair user restraint shall either:
- 3.8.2.3.5.1. meet the dynamic test requirements described in paragraph 3.8.2.3.9. and be securely attached to vehicle anchorages meeting the static test requirements in paragraph 3.8.2.3.6.; or
- 3.8.2.3.5.2. be securely attached to vehicle anchorages such that the combination of restraint and anchorages meets the dynamic test requirements described in paragraph 3.8.2.3.9. when attached to anchorages set up as described in paragraph 3.8.2.3.6.7.
- 3.8.2.3.6. 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:
- 3.8.2.3.6.1. the forces specified in paragraph 3.8.2.3.7. shall be applied by means of a device reproducing the geometry of the wheelchair restraint system;
- 3.8.2.3.6.2. the forces specified in paragraph 3.8.2.3.7.3. shall be applied by means of a device reproducing the geometry of the wheelchair user restraint and by means of a traction device specified in paragraph 6.3.4. of Regulation No. 14.

- 3.8.2.3.6.3. the forces in paragraph 3.8.2.3.6.1. and paragraph 3.8.2.3.6.2. shall be applied simultaneously in the forward direction and at an angle of  $10^{\circ} \pm 5^{\circ}$  above the horizontal plane;
- 3.8.2.3.6.4. the forces in paragraph 3.8.2.3.6.1. shall be applied in the rearward direction and at an angle of  $10^{\circ} \pm 5^{\circ}$  above the horizontal plane;
- 3.8.2.3.6.5. the forces shall be applied as rapidly as possible through the central vertical axis of the wheelchair space; and
- 3.8.2.3.6.6. the force shall be maintained for a period of not less than 0.2 seconds.
- 3.8.2.3.6.7. 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.
- 3.8.2.3.7. The forces specified in paragraph 3.8.2.3.6. are:
- 3.8.2.3.7.1. in the case of anchorages provided for a wheelchair restraint system fitted to a category M<sub>2</sub> vehicle:
- 3.8.2.3.7.1.1. 1110 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
- 3.8.2.3.7.1.2. 550 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;
- 3.8.2.3.7.2. in the case of anchorages provided for a wheelchair restraint system fitted to a category M<sub>3</sub> vehicle
- 3.8.2.3.7.2.1. 740 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
- 3.8.2.3.7.2.2. 370 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;
- 3.8.2.3.7.3. in the case of anchorages provided for a wheelchair user restraint system the forces shall be in accordance with the requirements of paragraph 6.4. of Regulation No. 14. **The forces shall be applied by means of a traction device as appropriate to the belt type as specified in Regulation No. 14.**

#### Justification

The performance of the anchorages for the wheelchair user restraint system will be influenced by the direction and distribution of the applied forces. This amendment specifies the same device as that intended for the testing of seat belt anchorages in accordance with Regulation No. 14.

- 3.8.2.3.8. A wheelchair restraint system shall be subject to a dynamic test carried out in accordance with the following requirements:
- 3.8.2.3.8.1. 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:
- 3.8.2.3.8.1.1. exceeding 20 g in the forward direction for a cumulative period of at least 0.015 seconds;
- 3.8.2.3.8.1.2. exceeding 15 g in the forward direction for a cumulative period of at least 0.04 seconds;
- 3.8.2.3.8.1.3. exceeding a duration of 0.075 seconds;
- 3.8.2.3.8.1.4. not exceeding 28 g and for not more than 0.08 seconds;
- 3.8.2.3.8.1.5. not exceeding a duration of more than 0.12 seconds, and
- 3.8.2.3.8.2. 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:
- 3.8.2.3.8.2.1. exceeding 5 g in the rearward direction for a cumulative period of at least 0.015 seconds;
- 3.8.2.3.8.2.2. not exceeding 8 g in the rearward direction and for not more than 0.02 seconds;
- 3.8.2.3.8.3. the test in paragraph 3.8.2.3.8.2. shall not apply if the same restraints are used for the forward and rearward direction or if an equivalent test has been conducted;
- 3.8.2.3.8.4. for the above test, the wheelchair restraint system shall be attached to either:
- 3.8.2.3.8.4.1. anchorages fixed to the test rig which represents the geometry of the anchorages in a vehicle for which the restraint system is intended, or
- 3.8.2.3.8.4.2. anchorages forming part of a representative section of the vehicle for which the restraint system is intended, set up as described in paragraph 3.8.2.3.6.7.
- 3.8.2.3.9. A wheelchair **user** restraint shall comply with the test requirements specified in ~~paragraph 7.7.4. of~~ Regulation No. 16 or an equivalent test to the deceleration-time pulse in paragraph 3.8.2.3.8.1. A seat belt approved to Regulation No. 16 and so marked shall be deemed to comply.
- 3.8.2.3.10. A test in paragraph 3.8.2.3.6., 3.8.2.3.8. or 3.8.2.3.9. shall be deemed to have failed unless the following requirements are met:
- 3.8.2.3.10.1. no part of the system shall have failed, or shall have become detached from its anchorage or from the vehicle during the test;

- 3.8.2.3.10.2. mechanisms to release the wheelchair and user shall be capable of release after completion of the test;
- 3.8.2.3.10.3. in the test in paragraph 3.8.2.3.8. the wheelchair shall not move more than 200 mm in the longitudinal plane of the vehicle during the test;
- 3.8.2.3.10.4. 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.
- 3.8.2.3.11. Its operating instructions shall be clearly displayed adjacent to it.
- 3.8.3.4. In alternative to the provisions of paragraph 3.8.1.1., the wheelchair space shall be Vehicles not required to have occupant restraint systems fitted may, as an alternative to the provisions of paragraph 3.8.2. or 3.8.3., be provided with a wheelchair space designed for the wheelchair user to travel unrestrained with the wheelchair facing rearwards against a support or backrest, in accordance with the following provisions:
- 3.8.4.1. a) one of the longitudinal sides of the space for a wheelchair shall rest against a side or wall of the vehicle or a partition;
- 3.8.4.2. b) a support or backrest perpendicular to the longitudinal axis of the vehicle shall be provided in the forward end of the wheelchair space;
- 3.8.4.3. e) the support or backrest shall be designed for [~~THE WHEELS OR~~] the back of the wheelchair to rest against the support or backrest in order to avoid the wheelchair from tipping over **AND SHALL COMPLY WITH THE PROVISIONS OF PARAGRAPH 3.8.5 OR 3.8.6 AS APPROPRIATE;**
- 3.8.4.4. ~~D) — THE SUPPORT OR BACKREST OF THE SEAT ROW IN FRONT SHALL BE ABLE TO WITHSTAND A FORCE OF 250 DAN ± 20 DAN PER WHEELCHAIR. THE FORCE SHALL BE APPLIED IN THE HORIZONTAL PLANE OF THE VEHICLE AND TOWARDS THE FRONT OF THE VEHICLE IN THE MIDDLE OF THE SUPPORT OR BACKREST. THE FORCE SHALL BE MAINTAINED FOR A PERIOD OF NOT LESS THAN 1.5 SECONDS;~~
- 3.8.4.5. e) a handrail or handhold shall be fitted to the side or wall of the vehicle in such a way to allow the wheelchair user to grasp it easily. **This handrail may, if fitted at a height not less than 850 mm above the floor of the wheelchair space, extend over the vertical projection of the wheelchair space by not more than 90 mm.**
- 3.8.4.6. f) a retractable handrail or any equivalent **rigid** device shall be fitted on the opposite side of the wheelchair space in order to restrict any lateral shift of the wheelchair and to allow the wheelchair user to grasp it easily;

~~g) — the floor surface of the special area shall be slip-resistant;~~

- 3.8.4.7**        h) a sign shall be fixed adjacent to the wheelchair area with the following text:  
"This space is reserved for a wheelchair. The wheelchair must be placed facing rearwards resting against the support or backrest with the brakes on"

JUSTIFICATION

IF A BACKREST IS NOT PROVIDED THERE IS A RISK THAT ANY OTHER FORM OF SUPPORT WILL RESTRICT THE MOVEMENT OF THE WHEELS OF A WHEELCHAIR BUT ALLOW THE WHEELCHAIR TO TIP OVER BACKWARDS WITH POTENTIAL RISK OF INJURY TO THE WHEELCHAIR USER. A SUPPORT COULD ALSO BE PROVIDED USING THE BACK OF A FORWARD FACING SEAT WITH THE POTENTIAL TO PLACE A RIGID STRUCTURE APPROXIMATELY IN THE MIDDLE OF A WHEELCHAIR USER'S BACK. THIS TOO COULD RESULT IN SIGNIFICANT INJURY TO THE WHEELCHAIR USER. THIS PROPOSAL AMENDS THE REQUIREMENTS SUCH THAT A BACKREST IS ALWAYS PROVIDED.

ALLOWANCE IS MADE FOR A HANDRAIL FITTED TO THE SIDE OR WALL TO OVERLAP THE WHEELCHAIR SPACE AS THIS CAN HELP KEEP THE WHEELCHAIR SPACE CLOSE TO A SIDEWALL AND ALLOW ROOM FOR A HANDRAIL. THIS CAN BENEFIT A WHEELCHAIR USER BY BRING THE HANDRAIL CLOSER AND ALSO TO ASSIST INDUSTRY WHEN PRODUCING NARROWER VEHICLES.

THE BACKREST STRENGTH REQUIREMENTS ARE MOVED TO THE NEXT PARAGRAPH.

**3.8.5.        A BACKREST FITTED TO A WHEELCHAIR SPACE IN ACCORDANCE WITH PARAGRAPH 3.8.4. SHALL COMPLY WITH THE FOLLOWING REQUIREMENTS (SEE FIG. A8/4) -**

**3.8.5.1.        THE BOTTOM EDGE OF A BACKREST SHALL BE AT A HEIGHT OF NOT LESS THAN 350 MM AND NOT MORE THAN 480 MM MEASURED VERTICALLY FROM THE FLOOR OF THE WHEELCHAIR SPACE;**

**3.8.5.2.        THE TOP EDGE OF A BACKREST SHALL BE AT A HEIGHT OF NOT LESS THAN 1300 MM MEASURED VERTICALLY FROM THE FLOOR OF THE WHEELCHAIR SPACE;**

**3.8.5.3.        A BACKREST SHALL HAVE A WIDTH OF -**

**3.8.5.3.1.        NOT LESS THAN 270 MM AND NOT MORE THAN 420 MM UP TO A HEIGHT OF 830 MM MEASURED VERTICALLY FROM THE FLOOR OF THE WHEELCHAIR SPACE, AND**

**3.8.5.3.2.        NOT LESS THAN 270 MM AND NOT MORE THAN 300 MM AT HEIGHTS EXCEEDING 830 MM MEASURED VERTICALLY FROM THE FLOOR OF THE WHEELCHAIR SPACE;**

**3.8.5.4.        A BACKREST SHALL BE FITTED AT AN ANGLE OF NOT LESS THAN 4° AND NOT MORE THAN 8° TO THE VERTICAL WITH THE BOTTOM EDGE OF THE BACKREST POSITIONED CLOSER TO THE REAR OF THE VEHICLE THAN THE TOP EDGE;**

**3.8.5.5.        THE PADDED SURFACE OF A BACKREST SHALL FORM A SINGLE AND CONTINUOUS PLANE;**

**3.8.5.6.        THE PADDED SURFACE OF A BACKREST SHALL PASS THROUGH ANY POINT ON AN IMAGINARY VERTICAL PLANE SITUATED TO THE REAR OF THE FRONT END OF THE WHEELCHAIR SPACE AND SITUATED NOT LESS THAN 100 MM AND NOT MORE THAN**

**120 MM FROM THE FRONT END OF THE WHEELCHAIR SPACE MEASURED HORIZONTALLY AND NOT LESS THAN 830 MM AND NOT MORE THAN 870 MM FROM THE FLOOR OF THE WHEELCHAIR SPACE MEASURED VERTICALLY; AND**

**3.8.5.7. A BACKREST SHALL BE CAPABLE OF BEARING A LOAD OF 250 DAN ± 20 DAN APPLIED FOR A MINIMUM OF 1.5 SECONDS BY MEANS OF A BLOCK 200 MM X 200 MM SQUARE IN THE LONGITUDINAL PLANE OF THE VEHICLE TOWARDS THE FRONT OF THE VEHICLE TO THE CENTRE OF THE PADDED SURFACE OF THE BACKREST AT A HEIGHT OF NOT LESS THAN 600 MM AND NOT MORE THAN 800 MM MEASURED VERTICALLY FROM THE FLOOR OF THE WHEELCHAIR SPACE. THE BACKREST SHALL NOT DEFLECT MORE THAN 100 MM OR SUFFER PERMANENT DEFORMATION OR DAMAGE.**

**3.8.6. A SUPPORT, NOT BEING A BACKREST MEETING THE REQUIREMENTS OF 3.8.4.1. ABOVE SHALL BE PROVEN TO PROVIDE COMPARABLE LEVELS OF PROTECTION AS SUCH A BACKREST. IT SHALL BE ABLE TO WITHSTAND A FORCE OF 250DAN ± 20DAN PER WHEELCHAIR APPLIED IN THE HORIZONTAL PLANE OF THE VEHICLE AND TOWARDS THE FRONT OF THE VEHICLE IN THE MIDDLE OF THE SUPPORT. THE FORCE SHALL BE MAINTAINED FOR A PERIOD OF NOT LESS THAN 1.5 SECONDS.**

#### JUSTIFICATION

THE POSITION, SHAPE AND METHOD OF TESTING THE BACKREST IS ADDED TO ENSURE THAT IT SUITS A WIDE RANGE OF WHEELCHAIR DESIGNS AND PROVIDES ADEQUATE PROTECTION TO A WHEELCHAIR USER. PROVISION IS MADE FOR AN ALTERNATIVE MEANS OF SUPPORT IF IT CAN OFFER AN EQUIVALENT LEVEL OF PROTECTION.

#### 3.9. Door controls

3.9.1. *If a door referred to in paragraph 3.6. is fitted with opening controls for use under normal circumstances ~~Any opening control adjacent to a door referred to in paragraph 3.6~~ whether being outside or inside of the vehicle, these controls shall be adjacent to that door at a height between 850 mm and ~~not higher than~~ 1 300 mm from the ground or the floor.*

#### ~~3.10. Lighting (Reserved)~~

~~3.10.1. Adequate lighting shall be provided to illuminate the area inside and immediately outside the vehicle to allow people with reduced mobility to board and alight in safety. Any lighting likely to affect the driver's vision shall operate only while the vehicle is at rest.~~

#### Justification

The provisions of paragraph 3.10. are moved to annex 3, paragraphs 7.8.1.3. and 7.8.3.

#### 3.11. Provisions for boarding aids devices

##### 3.11.1. General requirements:

- 3.11.1.1. The controls actuating the boarding aids devices shall be clearly marked as such. The extended or lowered position of the boarding aid device shall be indicated by a tell-tale to the driver.
- 3.11.1.2. 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.
- 3.11.1.3. Access to one of the service or emergency doors on the vehicle may be obstructed by a boarding aid device providing the following two conditions are satisfied from both inside and outside the vehicle.
- 3.11.1.3.1. The boarding device does not obstruct the handle or other device for opening the door.
- 3.11.1.3.2. The boarding device can be readily moved to leave the doorway clear for use in an emergency.
- 3.11.2. Kneeling system
- 3.11.2.1. A switch shall be required to enable operation of the kneeling system.
- 3.11.2.2. 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.
- 3.11.2.3. The lowering ~~or raising~~ 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.
- 3.11.2.4. Any kneeling system, ~~that which~~ is fitted to a vehicle shall ~~not~~ **neither**:
- 3.11.2.4.1. 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, ~~or~~ **nor**
- 3.11.2.4.2. allow the vehicle to be ~~raised or~~ lowered when the operation of the service door is prevented for any reason.
- 3.11.3. Lift
- 3.11.3.1. General provisions
- 3.11.3.1.1. Lifts shall only be capable of operation when the vehicle is at standstill. When raising of the platform and before lowering is initiated a device preventing the wheelchair from rolling off shall automatically come into operation.

3.11.3.1.2. The lift platform shall not be less than 800 mm wide, and not less than 1200 mm long and shall be capable of operating when carrying a mass of at least 300 kg.

3.11.3.2. Additional technical requirements for power-operated lifts

3.11.3.2.1. 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.

3.11.3.2.2. 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.

3.11.3.2.3. 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.

3.11.3.3. Operation of power operated lifts

3.11.3.3.1. 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.

3.11.3.3.2. 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.

3.11.3.4. Manually operated lift

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

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

3.11.4. Ramp

3.11.4.1. General provisions

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

3.11.4.1.2. 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.

3.11.4.1.3. The **USEABLE SURFACE OF A** ramp shall be at least 800 mm wide. The **SLOPE USEABLE SURFACE** of the ramp, when extended or folded out on to a kerb of 150 mm in height **ABOVE THE GROUND**, ~~SHOULD~~ **SHALL** not exceed **A SLOPE OF** 12 per cent. A kneeling system may be used to achieve this test.

**THE RAMP SHALL BE CAPABLE OF EXTENDING OR FOLDING OUT ON TO THE GROUND AND IN THAT POSITION THE USEABLE SURFACE OF THE RAMP SHALL NOT**



**EXCEED A SLOPE OF 36 PER CENT. A KNEELING SYSTEM MAY BE USED TO ACHIEVE THIS TEST.**

**THESE REQUIREMENTS SHALL NOT APPLY TO SHORT TRANSITION SECTIONS OF THE RAMP SURFACE OF NO MORE THAN 150 MM IN LENGTH MEASURED IN THE DIRECTION OF WHEELCHAIR TRAVEL AND PROVIDING:**

**A) THE SLOPE OF A SECTION DOES NOT EXCEED 27 PER CENT WHEN MEASURED WITH THE RAMP RESTING ON A KERB OF 150 MM IN HEIGHT AND 36 PER CENT WHEN MEASURED WITH THE RAMP RESTING ON THE GROUND;**

**B) A SECTION DOES NOT RISE TO A HEIGHT OF MORE THAN 15 MM MEASURED ABOVE AND PARALLEL TO THE SURFACE OF THE RAMP; AND**

**C) THE NUMBER OF TRANSITION SECTIONS IS KEPT TO A MINIMUM (SEE FIG. A8/2).**

3.11.4.1.4. Any ramp which when ready for use exceeds 1200 mm in length shall be fitted with a device to prevent the wheelchair rolling off the sides.

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

**3.11.4.1.6. 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 WITH THE REMAINDER OF THE RAMP SURFACE. THE BAND OF COLOUR SHALL EXTENDED ALONG THE OUTERMOST EDGE AND ALONG BOTH EDGES PARALLEL TO THE DIRECTION OF TRAVEL OF THE WHEELCHAIR. MARKING OF ANY TRIP HAZARD OR WHERE PART OF THE RAMP SURFACE ALSO FORMS PART OF A STEP IS PERMISSIBLE.**

**3.11.4.1.7. NO PART OF THE USEABLE SURFACE IN SUB-PARAGRAPH 3.11.4.1.3. SHALL FORM AN OBSTRUCTION TO A WHEELCHAIR USER. AN OBSTRUCTION IS CONSIDERED ACCEPTABLE IF:**

**3.11.4.1.7.1. AT THE POINT WHERE THE RAMP MEETS THE KERB OR GROUND IT IS POSSIBLE TO CONTACT THE MAIN SURFACE OF THE RAMP OR A TRANSITION SECTION LEADING TO THE MAIN SURFACE AS SPECIFIED IN 3.11.4.1.3. AT OR BELOW A PLANE PARALLEL TO, AND NOT EXCEEDING 15MM IN HEIGHT MEASURED ABOVE THE SURFACE OF THE KERB OR THE GROUND, THIS MUST BE ACHIEVED WITH THE RAMP RESTING ON A KERB 150MM IN HEIGHT AND WHEN RESTING ON THE GROUND. (SEE FIG A8/1);**

**3.11.4.1.7.2. IT IS A TRANSITION SECTION IN ACCORDANCE WITH 3.11.4.1.3. (SEE FIG A8/2);**

**3.11.4.1.7.3. NO PART OF THE RAMP SURFACE IS MORE THAN 6 MM ABOVE OR 6 MM BELOW THE LEVEL OF AN ADJACENT SURFACE. THIS SHALL BE MEASURED IN THE DIRECTION OF WHEELCHAIR MOTION AND PARALLEL TO THE RAMP SURFACE. FOR ANY PART OF THE RAMP THAT IS ENTIRELY OUTSIDE THE VEHICLE THE TOTAL OF SUCH SURFACE CHANGES SHALL NOT EXCEED 6MM (SEE FIG A8/3);**

**3.11.4.1.7.4. A TRANSITION SECTION IN ACCORDANCE WITH 3.11.4.1.3. IS NOT COMBINED WITH AN OBSTRUCTION IN ACCORDANCE WITH 3.11.4.1.6.3. UNLESS THE OVERALL HEIGHT OF THE TRANSITION AND OBSTRUCTION DO NOT EXCEED 15MM MEASURED ABOVE AND PARALLEL TO THE SURFACE OF THE RAMP.**

**3.11.4.1.7.5. 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 AND SECURELY STOWED AND WHERE IT IS READILY AVAILABLE FOR USE.**

#### JUSTIFICATION

EXPERIENCE WITH THE OPERATION OF VARIOUS RAMP DESIGNS TOGETHER WITH TRIALS UNDERTAKEN WITH THE HELP OF WHEELCHAIR USERS HAVE IDENTIFIED A NUMBER OF DESIGN FEATURES WHICH MAKE THE USE OF A RAMP MORE EASY TO USE AND SAFER FOR THE WHEELCHAIR USER. THE PROPOSED SPECIFICATION HAS BEEN DEVELOPED IN CONJUNCTION WITH EUROPEAN RAMP MANUFACTURERS SUPPLYING THE UK MARKET.

KEY FEATURES OF THE SPECIFICATION ARE THE REDUCTION IN HEIGHT OF OBSTRUCTIONS AND REDUCTION IN THE HEIGHT AND SLOPE OF TRANSITION SECTIONS OF THE RAMP. THESE HELP TO REDUCE THE EFFORT REQUIRED OF A WHEELCHAIR USER WHEN ENCOUNTERING AN OBSTRUCTION ON A SLOPING SURFACE AND TO MINIMISE THE INCREASE IN WHEELCHAIR ANGLE AS IT ENCOUNTERS TRANSITION SECTIONS THUS REDUCING THE POTENTIAL TO TIP OVER BACKWARDS.

PARAGRAPH 3.11.4.3.2. IS AMEND TO ENSURE THAT THE EXTENSION OF A POWER OPERATED RAMP DOES NOT CAUSE INJURY REGARDLESS OF THE DIRECTION OF MOTION.

THE REVISED RAMP DEFINITION (MAIN TEXT, PARAGRAPH 2.33) DEFINES THOSE PARTS FORMING A RAMP FROM WHICH IT IS POSSIBLE TO DEFINE THE EDGES OF THE RAMP THAT NEED TO BE MARKED. IT IS CONSIDERED THAT THE EXTREME OUTER EDGE MUST BE MARKED TO SHOW WHERE THE RAMP STARTS AND THAT BOTH EDGES RUNNING PARALLEL TO THE DIRECTION OF WHEELCHAIR TRAVEL BE MARKED TO REDUCE THE RISK OF A WHEELCHAIR MOVING OFF THE SIDE AND TO AVOID ANY SIDE OBSTRUCTIONS. THE INNER EDGE NEED NOT BE MARKED BUT IT SHOULD BE PERMITTED FOR ANY PART OF THE RAMP THAT MAY BE A TRIP HAZARD OR, IN ANOTHER POSITION FORMS A STEP, TO BE MARKED. THESE MARKINGS SHOULD APPLY TO ALL RAMPS AND NOT JUST THOSE THAT ARE POWER OPERATED.

A SINGLE BAND OF CONTRASTING COLOUR HAS BEEN FOUND MORE EFFECTIVE THAN HAZARD MARKINGS. FURTHERMORE, RETRO-REFLECTIVE MARKINGS HAVE NO VALUE WITHOUT A LIGHT SOURCE DIRECTED AT THEM AND ARE THEREFORE INEFFECTIVE IN DAYLIGHT. THEREFORE IT IS PROPOSED THAT THIS MARKING BE REMOVED.

3.11.4.2. Modes of operation

3.11.4.2.1. Extension and retraction of the ramp may be carried out either manually or power-operated.

3.11.4.3. Additional technical requirements for power-operated ramps

- 3.11.4.3.1. Extension and retraction of the ramp shall be indicated by flashing yellow lights and an audible signal; ~~THE RAMPS SHALL BE IDENTIFIABLE BY CLEARLY VISIBLE RED AND WHITE RETRO-REFLECTING HAZARD MARKINGS ON THE OUTER EDGES.~~

JUSTIFICATION

SEE PREVIOUS JUSTIFICATION.

- 3.11.4.3.2. Extension of the ramp in the horizontal direction shall be protected by a safety device.

- 3.11.4.3.3. *~~In the event of one of these safety devices coming into operation, the movement of the ramp shall immediately be stopped. These safety devices shall immediately stop the movement of the ramp when the ramp is subject to a reactive force not exceeding 150N.~~*

- 3.11.4.3.4. The horizontal movement of a ramp shall be interrupted when ~~it is loaded with~~ a mass of 15 kg *is placed upon it.*

3.11.4.4. Operation of power-operated ramps

- 3.11.4.4.1. *~~Where the ramp is at a service door situated within the direct field of vision of the driver of the vehicle, the ramp may be operated by the driver when in the driver's seat. 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 suitable indirect vision devices.~~*

- 3.11.4.4.2. 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 from his seat.

3.11.4.5. Operation of manually-operated ramp

- 3.11.4.5.1. The ramp shall be so designed that excessive forces are not required to operate the ramp.
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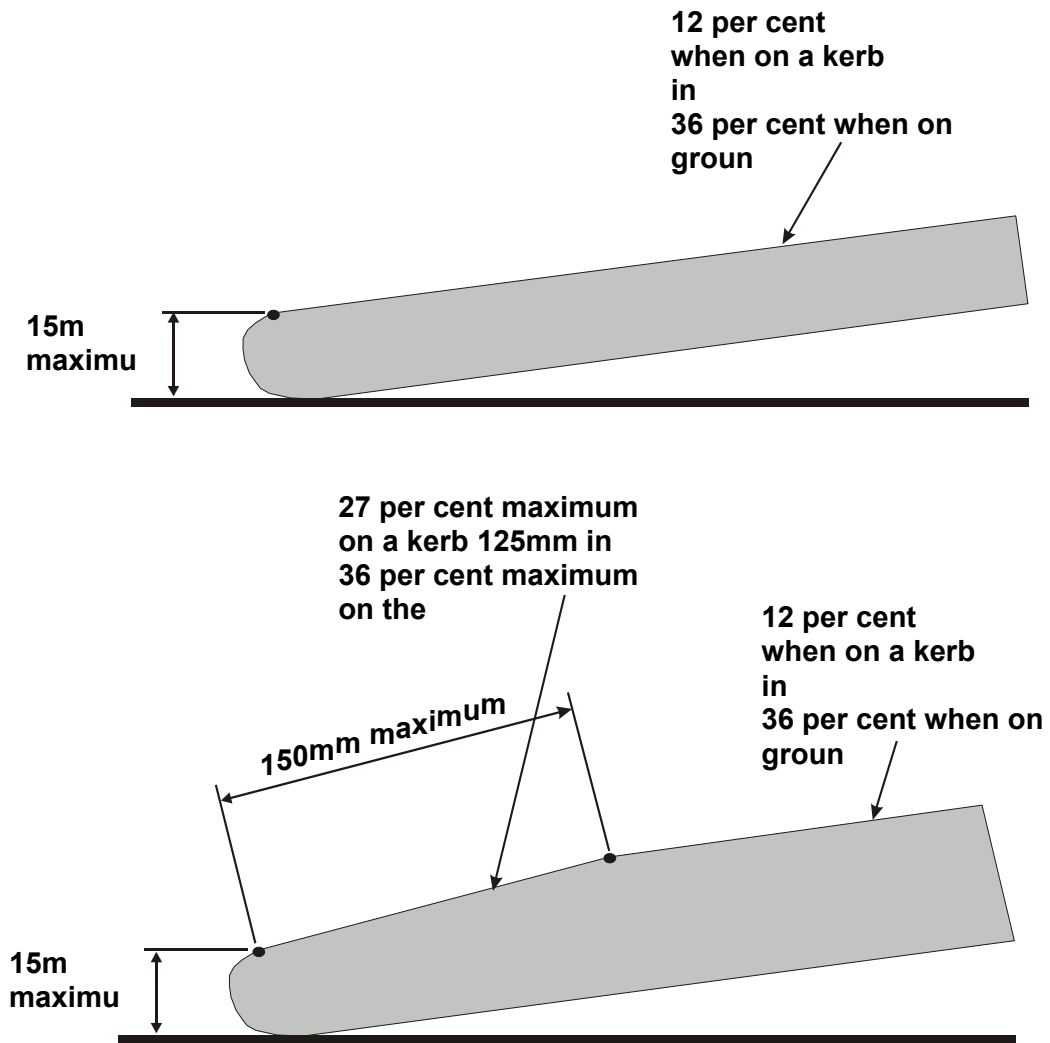


Fig.  
Paragraph

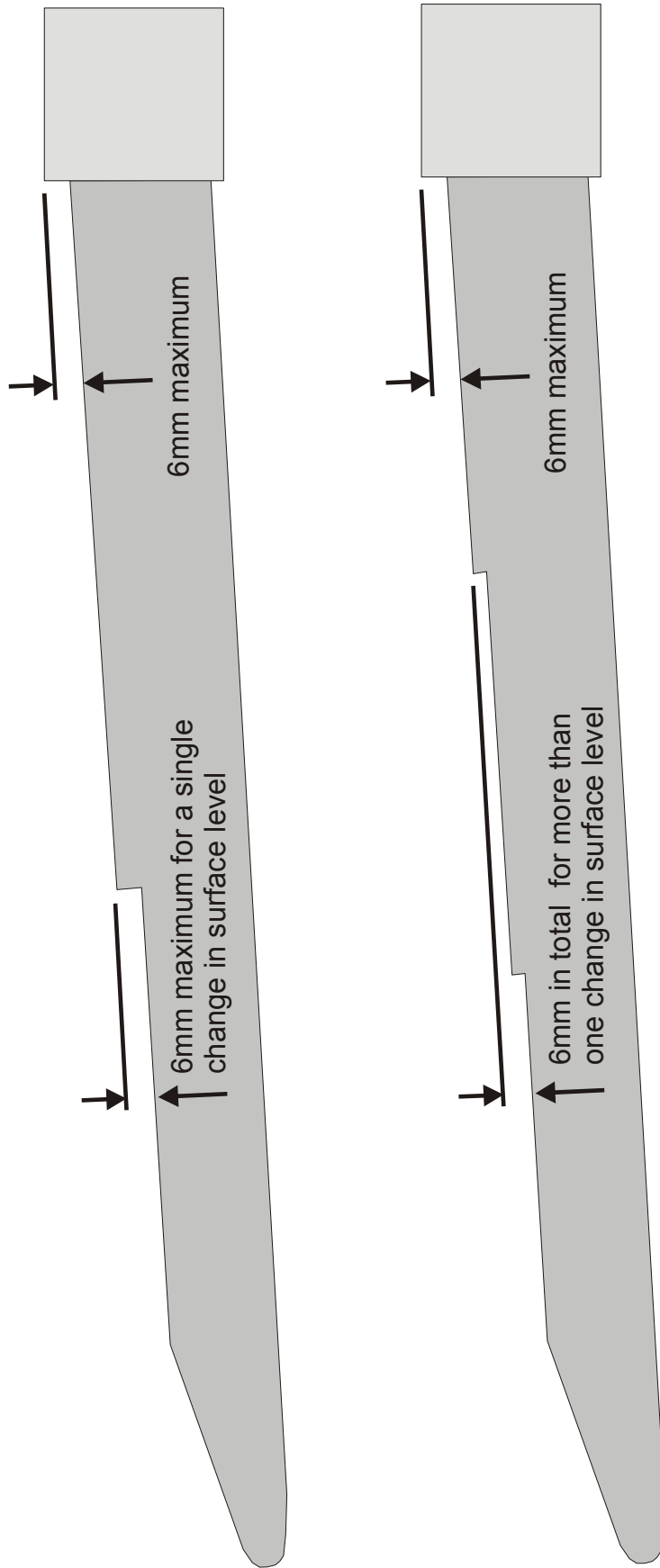


Fig. A8/2  
Paragraphs 3.11.4.1.3. and 3.11.4.1.7.2.

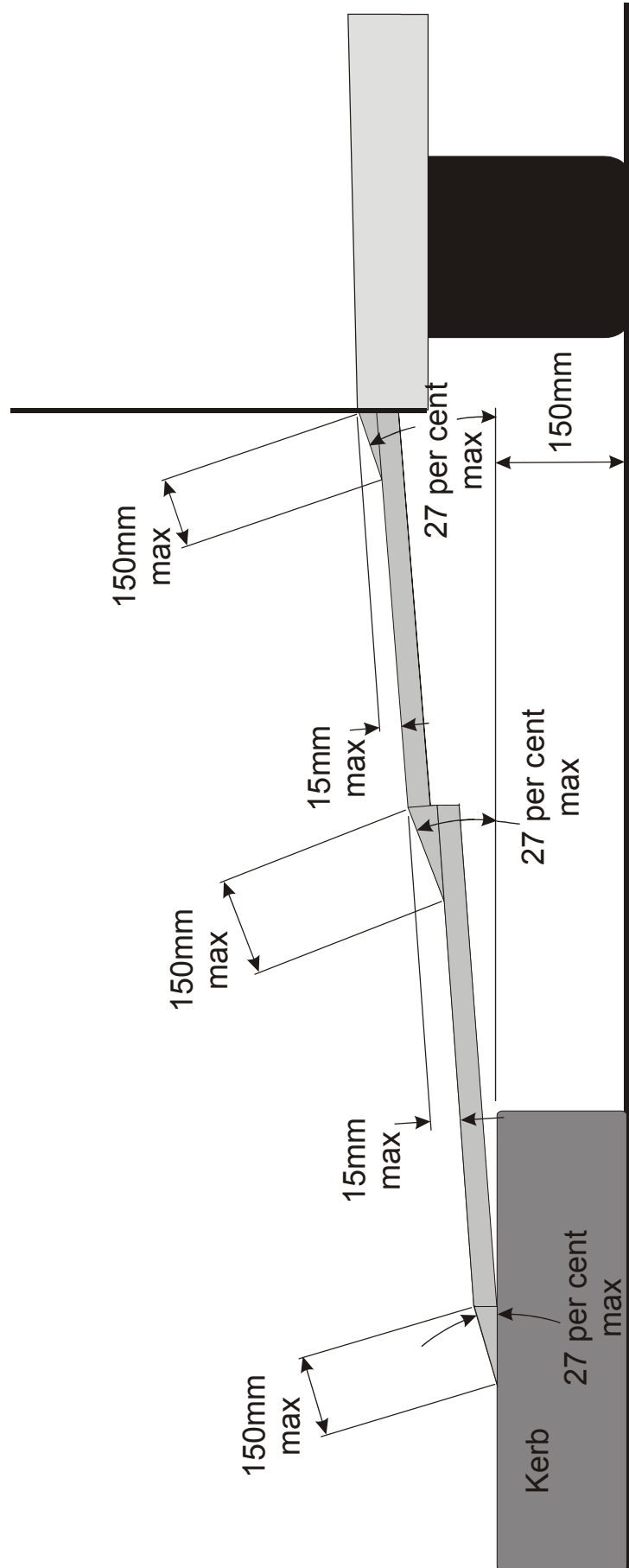


Fig. A 8/3  
Paragraph 3.11.4.1.7.3.

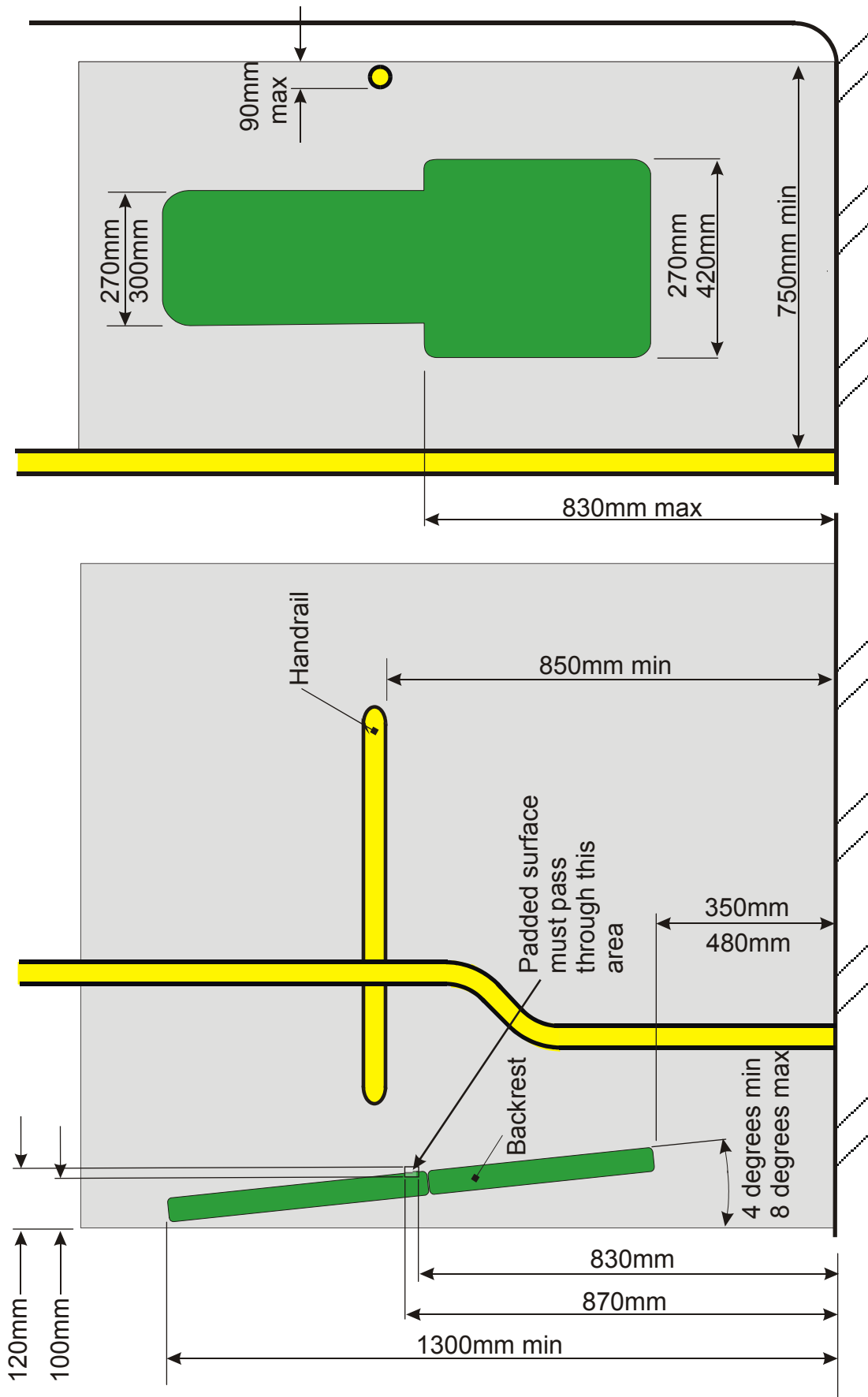


Fig. A 8/4  
Paragraph 3.8.4.

## Annex 11

### MASSES AND DIMENSIONS

- 7.4.3. Requirements for buses and coaches
- 7.4.3.1. The requirements of paragraphs 7.4.2.1. to 7.4.2.3. and of 7.4.2.7., apply.
- 7.4.3.2. The mass of the vehicle in running order, plus the mass  $Q$  multiplied by the number of seated and standing passengers, plus masses  $WP$ ,  $B$  and  $BX$  as defined in paragraph 7.4.3.3.1., plus the technical permissible mass on the coupling point, if a coupling is fitted by the manufacturer, shall not exceed the mass  $M$ .
- 7.4.3.3. When the vehicle in running order is laden as described in paragraph 7.4.3.3.1., the mass corresponding to the load on each axle must not exceed the mass  $m_i$  on each axle, and the mass corresponding to the load on each solo axle or group of axles must not exceed  $\mu_j$  on that group of axles. Moreover, the mass corresponding to the load on the driving axle or the sum of masses, corresponding to the loads on the driving axles must be at least 25 per cent of  $M$ .
- 7.4.3.3.1. The vehicle in running order is loaded with: a mass corresponding to the number  $P$  of seated passengers, of mass  $Q$ ; a mass corresponding to the number  $SP$  of standing passengers, of mass  $Q$  uniformly distributed over the surface available for standing passengers  $S1$ ; where appropriate, a mass  $WP$  uniformly distributed over each wheelchair space; a mass equal to  $B$  (kg) uniformly distributed in the baggage compartments; a mass equal to  $BX$  (kg) uniformly distributed over the surface area of the roof equipped for the carriage of baggage, where:
- $P$  is the number of seating places.
- $S1$  is the area for standing passengers. In the case of vehicles of classes III or B,  $S1$  is 0.
- $SP$ , declared by the manufacturer, must not exceed the value  $S1/SSp$  where  $SSp$  is the conventional space provided for one standing passenger specified in the table below.
- $WP$  (kg) is the number of wheelchair spaces multiplied by 250kg representing the mass of a wheelchair and user.
- $B$  (kg), declared by the manufacturer, must have a numeric value of not less than  $100 \times V$ . This shall include baggage compartments or racks that may be attached to the outside of the vehicle.



V is the total volume of baggage compartments in m<sup>3</sup>. When approving a vehicle of Class I or A, the volume of baggage compartments accessible only from the outside of the vehicle shall be disregarded.

BX, declared by the manufacturer, must have a numeric value not less than 75kg/m<sup>2</sup>.

Double deck vehicles shall not be equipped for the carriage of baggage on the roof and therefore BX for double deck vehicles shall be zero.

Q and SSP have values laid down in the following table:

| Vehicle class   | Q (kg) mass of one passenger | SSp (m <sup>2</sup> /passenger)<br>Conventional space for one standing passenger |
|-----------------|------------------------------|--|
| Class I and A   | 68                           | 0.125  |
| Class II        | 71 <sup>*/</sup>             | 0.15   |
| Class III and B | 71 <sup>*/</sup>             | None   |

<sup>\*/</sup> including 3 kg for hand luggage.

7.4.3.3.2. In the case of a vehicle equipped with a variable seating capacity, area available for standing passengers (S1) and /or equipped for the carriage of wheelchairs, the requirements of sections 7.4.3.2 and 7.4.3.3 shall be determined for each of the following conditions applicable:

7.4.3.3.2.1. with all possible seats occupied followed by the remaining area for standing passengers (up to the standing capacity limit declared by the manufacturer, if reached), EXCLUDING AREAS INTENDED FOR USE EXCLUSIVELY BY WHEELCHAIR USERS and, if space remains, any wheelchair spaces occupied;

7.4.3.3.2.2. with all possible standing areas occupied (up to the standing capacity limit declared by the manufacturer), EXCLUDING AREAS INTENDED FOR USE EXCLUSIVELY BY WHEELCHAIR, followed by the remaining seats available for seated passengers and, if space remains, any wheelchair spaces occupied;

7.4.3.3.2.3. with all possible wheelchair spaces occupied followed by the remaining area for standing passengers (up to the standing capacity limit declared by the manufacturer, if reached) and then the remaining seats available for use occupied.

7.4.3.4 When the vehicle is in running order or laden as specified in section 7.4.3.3.1, the mass corresponding to the load on the front axle or group of axles must not be less than the percentage of the mass of the vehicle in running order or of the technically permissible laden mass 'M' laid down in the following table:

| Classes I and A |             | Class II |             | Classes III and B |             |
|-----------------|-------------|----------|-------------|-------------------|-------------|
| Rigid           | Articulated | Rigid    | Articulated | Rigid             | Articulated |
| 20              | 20          | 25(1)    | 20          | 25(1)             | 20          |

(1) this figure is reduced by 20% for 3 axle vehicles of classes II and III having two steered axles.

7.4.3.5. Where a vehicle is to be approved to more than one Class, paragraphs 7.4.3.2. and 7.4.3.3 shall apply to each Class.

7.4.4. (Reserved)

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