

Recommended Minimum Specification Requirements for Vehicle Modification as Wheelchair Accessible Private Cars for Passengers with Mobility Disability

The following requirements are recommended for a wheelchair being used as a passenger seat inside a Private Car. The design and construction of the wheelchair shall conform to ISO 7176-19 or equivalent standards in order to match with the recommended wheelchair and occupant restraining system ISO 10542 or equivalent. A head and back restraint meeting ECE R17 is recommended to protect the head and neck of the occupant. Applicant is requested to submit justifications on any deviations from requirements as stipulated below for consideration.

1. Vehicle Construction

1.1 Low-floor Vehicles

The vehicle shall preferably be of low floor type to provide easy vehicle access and wheelchair boarding and alighting. It is recommended that the floor of wheelchair and occupant entrance point shall be at a level not higher than 450 mm above ground. Some vehicles can be equipped with a body height adjustment or kneeling device which shall facilitate lower entrance height.

1.2 Strength of Body, boarding devices and Certification

The body shell and structure of the vehicle floor, and that portion of the vehicle to which the boarding devices are to be attached shall be robust and rigid enough to withstand the expected stresses during operation of the boarding devices and vehicle traveling at all rated loads without noticeable deformation. The boarding devices shall be **certified** annually by an independent and qualified surveyor on the safety of design, construction and a safe working load of minimum 300 kg or as specified by the vehicle manufacturer. Any alteration to the body shell and structure shall have to be either endorsed by the vehicle manufacturer, or a reputable testing/certifying agent together with testing reports.

1.3 Weight

The gross vehicle weight (GVW) including the weight of the boarding devices, the driver and permitted number of passengers and, their personal effects and the wheelchair, shall not exceed the maximum allocated weight at all times as stipulated in Part I of the Second Schedule of the Road Traffic (Construction and Maintenance of Vehicles) Regulations, Cap. 374A and the Maximum Designed Laden Weight of the vehicle. It is recommended that the weight of a reference wheelchair and its occupant shall be no less than **160 kg**.

2. Wheelchair Boarding Devices

2.1 Wheelchair Lift (power-operated)

If an electric wheelchair lift is fitted as a wheelchair boarding device, the wheelchair lift shall be of under-floor or tail lift type. The minimum safe working load (lifting capacity) of the lift shall be 300 kg or specified by the vehicle manufacturer. The minimum lift floor area shall not be less than 800 mm (width) x 1200 mm (length). The entrance clear height of the vehicle for the wheelchair shall be minimum 1350 mm.

The edges of the lift shall be rounded to 2.5 mm or more, and corners 5 mm or more. The lift platform shall be covered with anti-slip material. 50 mm bright yellow stripes shall be applied on the sides and perimeter of the upper surface of the lift. A device preventing the wheelchair from rolling off the sides shall automatically come into operation with the platform. When the lift is in the fully stowed / retracted position, no part of the lift system shall protrude beyond the vehicle body.

The lift shall be operated at low voltage of 12 or 24 V, controlled by a switch that would return to off position if released, and be operable only when the vehicle is stationary. A buzzer and yellow flashing lights visible to the rear traffic shall operate with the lift. An overload system shall be incorporated to stop the operation in the event of overload or blockage of moving parts. An emergency stop switch shall be provided and clearly marked on the outside of the vehicle adjacent to the lift operating area. Manual hand pump shall be equipped as a standby facility

2.2 Wheelchair Ramp (manual or power-operated)

If a mechanical ramp is provided in place of a power lift, it can be manual or 12-24 V electric power operated. The structural design of the ramp shall be robust and rigid enough to provide access of effective width 800 mm minimum x length 1700 mm maximum. It shall be secured to the vehicle when it is in use, and able to withstand the loaded weight of the wheelchair and occupant of minimum 300 kg or as specified by the vehicle manufacturer during operation without excessive deformation and vibration. It shall be covered with anti-slip material, and fitted with devices that will prevent the wheelchair rolling over the sides or fall back under gravity. The edges of the ramp shall be rounded to 2.5 mm or more, and corners 5 mm or more. Bright yellow stripes 50 mm width shall be applied on the sides and perimeter of the upper surface of the ramp. Maximum gradient of the ramp shall not exceed 7 degrees or 12%.

2.3 Marking

Clear marking showing the safe working load of the wheelchair lift or ramp shall be displayed conspicuously on the equipment surface or adjacent to the board devices' control unit

3. Wheelchair Accommodation

For each wheelchair, there shall be a fixed accommodation area/space to accommodate the wheelchair and its occupant all through the journey when the vehicle is moving. The accommodation area/space shall be minimum 740mm width and 1300mm length along the vehicle, with minimum headroom 1375mm. This floor area shall be as level as possible and shall be no steeper than 4 degree to the rear or 0 degree to the front, covered with anti-slip material and marked with 50mm band of bright yellow depicting the perimeter. No other hard object is allowed in this space except the seat back of a seat in the front which shall be covered with soft pads. Hard objects in the surrounding area shall be covered with soft pads as far as practicable. Side facing seating position is not acceptable.

4. Wheelchair Tie-down and Occupant Restraint Systems (WTORS)

A WTORS consists separately of a wheelchair tie-down system and a wheelchair

occupant body restraint system working together.

4.1 Wheelchair tie-down System

A wheelchair tie-down system is required to hold the wheelchair in the accommodation area in vehicle deceleration or frontal collision. This system shall therefore function as seat anchors when the wheelchair is being used as a seat on a vehicle. There are various designs of tie-down system to suit different wheelchairs, e.g. 4-point tie down, clamping, and docking. The 4-point tie down system appears to suit most wheelchairs but would normally need more space for installation.

Under r5(1) of Road Traffic (Construction and Maintenance of Vehicles) Regulations, Cap. 374A –

- Every vehicle including all body work and fittings shall be-
- (a) soundly and properly constructed of suitable materials;
 - (b) in good and serviceable condition; and
 - (c) of such design and method of construction as to be capable of withstanding the loads and stresses likely to be encountered in operation.

Transport Department shall accept a wheelchair (when being used as a seat) having met these requirements when it has been tied down properly by a tie-down system of construction meeting either the vehicle manufacturer's design standard; ISO 10542 standard or other equivalent standards.

4.2 Wheelchair Occupant Restraint System

Under Road Traffic (Safety Equipment) Regulations, in a Private Car, a passenger seat shall be provided with an approved seat belt and approved anchorage points for protection of the passenger. As such, when a wheelchair is being used as a passenger seat in a Private Car,

The seat belt and its anchorage points shall comply with the following standards:

- (i) ISO 10542 or equivalent, and
- (ii) Road Traffic (Safety Equipment) Regulations, Cap 374F.

4.3 Certification

The compliance of the WTORS with the above-mentioned standards shall be certified in writing by the vehicle manufacturer or a recognized testing authority such as TÜV of Germany, Vehicle Certification Agency (VCA) of the U.K., or other testing agencies approved by the Commissioner for Transport.

**Vehicle Safety and Standards Division
Transport Department
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