

# Requirements for urban buses in New Zealand

December 2008

# Contents

<b>Section one: General arrangement</b> .....	<b>3</b>
1.1 Introduction .....	3
1.2 Purpose and scope .....	4
1.3 Applicability of requirements .....	5
<b>Section two: Design and performance</b> .....	<b>6</b>
2.1 Introduction .....	6
2.2 Maximum vehicle age and fleet average age profile .....	6
2.3 Engine .....	6
2.4 Transmission .....	6
2.5 Suspension .....	7
2.6 Stability and steering .....	7
2.7 Braking .....	7
<b>Section three: Access</b> .....	<b>8</b>
3.1 Introduction to the priority seating area .....	8
3.2 Doors .....	9
3.3 Step height/depths .....	10
3.4 Floors .....	10
3.5 Aisle width .....	10
3.6 Seating configuration .....	11
3.7 Seating .....	11
3.8 Luggage/stroller/prams/mobility devices .....	12
<b>Section four: Vehicle interior, entrance and exit</b> .....	<b>13</b>
4.1 Introduction .....	13
4.3 Stanchions/handrails .....	13
4.4 Grab handles .....	14
4.5 Lighting .....	14
4.6 Security .....	14
4.7 Heating, ventilation and air conditioning .....	15
4.8 Demisting .....	15
<b>Section five: Communication</b> .....	<b>16</b>
5.1 Introduction .....	16
5.2 Bus stopping signals .....	16
5.3 External destination display .....	17
5.4 Internal information .....	18
5.5 Driver operational communication .....	18
<b>Section six: Facilities for passengers with impairments</b> .....	<b>19</b>
6.1 Introduction .....	19
6.2 Priority seating area .....	19
6.3 Wheelchairs .....	19
6.4 Boarding or alighting .....	20
6.5 Ramp .....	21
<b>Section seven: Driver compartment</b> .....	<b>22</b>
<b>Section eight: Existing buses</b> .....	<b>23</b>
8.1 Introduction .....	23
8.2 Existing bus standards .....	23

## Section one: General arrangement

### 1.1 Introduction

Regional councils have requested advice from the NZTA as to the terms that should be in their new contracts for the provision of urban bus services, if those services are to provide for better access and usability of vehicles by passengers. The Bus and Coach Association has also indicated its interest in obtaining more uniformity than currently exists in 'vehicle quality standards' used by regional authorities throughout New Zealand for operational reasons and potential cost savings. NZTA staff agreed that it was beneficial to develop a set of vehicle requirements for urban buses to be applied nationally. A key issue was how to provide for the mobility needs of people with physical, sensory and cognitive impairments.

NZTA staff have worked with Bus and Coach Association New Zealand, Auckland Regional Transport Authority, Environment Canterbury, Greater Wellington Regional Council and Designline International Holdings (NZ) to produce a draft document which was consulted on publicly, under the joint auspices of the NZTA and the Bus and Coach Association New Zealand.

The NZTA has managed the consultation process for the draft document. Interested groups received the draft document by email and post, and consultation was invited via the NZTA and Bus and Coach Association's websites.

Twenty-nine submissions were made, two key stakeholder groups commented: regional councils and representatives of people with physical, sensory and cognitive impairments whose mobility needs have been addressed in this document.

This document is subsidiary to the legislative requirements for buses in New Zealand, namely:

Land Transport Rule: Passenger Service Vehicles 1999 (the PSV Rule) [Rule 31001]

Land Transport Rule: Heavy Vehicles 2004 [Rule 31002]

Land Transport Rule: Vehicle Exhaust Emissions 2007 [Rule 33001/2]

Land Transport Rule: Heavy Vehicle Brakes 2006 [Rule 32015]

Land Transport Rule: Vehicle Equipment 2004 [Rule 32017]

Land Transport Rule: Vehicle Dimensions and Mass 2002 [Rule 41001]

Land Transport Rule: Vehicle Standards Compliance 2002 (the Compliance Rule) [Rule 35001/1]

Land Transport (Road User) Rule 2004 [S.R. 2004/427]

The vehicle must also meet other rules for vehicle systems, parts and components see [www.landtransport.govt.nz/rules/](http://www.landtransport.govt.nz/rules/)

## 1.2 Purpose and scope

### Purpose

This document aims to enhance the attractiveness of urban public transport vehicles in order to encourage increased usage, with a particular emphasis on improving accessibility. It will form part of the Procurement Manual that regional authorities will be required to use when undertaking procurement of public transport services. As such its application will be considered on a case-by-case basis. Regional authorities should note, however, that these requirements are the starting point, and any variations will need to be justified.

At a national level, this will have significant impacts on:

- improving the perception held by existing and potential users that buses can be used for all urban travel, including commuter, shopping, school and recreational activities travel
- people with physical, sensory and cognitive impairments who would otherwise be disabled regarding public transport
- the requirements for funding for roading and public transport
- minimising the rate of increase of urban traffic congestion.

This document is intended for use by regional authorities in their procurement of urban bus services, and specifies:

- requirements that apply to all buses (both new and used imports) that enter urban service from 1 January 2010 (sections 2 to 7)
- requirements for buses in the existing fleet (section 8).

In this manner, an improvement in the standards of buses will be achieved on a progressive basis.

Although the document specifies requirements that apply to all buses entering urban service from 1 January 2010 (and includes requirements for existing buses), the document can be used by regional authorities and incorporated into their new tender documentation prior to this date. The NZTA is aware of some tender rounds coming up in 2009 that are likely to result in vehicles being in place by the end of 2009. Given these dates are so close to the introduction date, it would be unwise not to take advantage of the document. In order to mitigate the effects on any existing bus orders or contracts which operators may have for the replacement of their fleet, regional authorities may need to work through a transition plan with operators to resolve this transitional issue. This is up to regional authorities to determine after discussions with operators.

Regional authorities should note that some transitional provisions will be able to be negotiated.

The practical implementation of these requirements may show new ways of dealing with particular issues that may arise and the intent is that we should make improvements if need be. It is therefore proposed that this document is reviewed in three years from the date of introduction of these requirements, ie 2013.

### Guidance

In addition to setting out the requirements themselves, this document provides guidance as to additional matters that can be considered by regional authorities.

Guidance material and best practice are also provided in this document in dark grey boxes with white text.

### Items not included

The NZTA is also aware that there are other issues as important as vehicle design and construction. The quality of the infrastructure that forms a significant part of being able to use a public transport system is just as

important, eg bus stop location and facilities in terms of weather protection, information, suitability for use by persons of all ages and capability. However, defining the infrastructure requirements is not included as part of this document, nor is driver training. The document also does not cover a special feature that is currently being trialled by Environment Canterbury, namely a facility for people to carry bicycles on a rack at the front of the bus. There are indications that the trial will be successful, but it is too early to include this at the moment. It is important to be aware that the overall length of the bus with the bike rack fitted in front will not be able to exceed the length permitted in the Vehicle Dimensions and Mass Rule.

### 1.3 Applicability of requirements

For the purpose of this document, a bus is a vehicle that provides a service with more than 12 seating positions. At present, many buses do not cater as well as they should to meet the mobility needs of people with physical, sensory and cognitive impairments, and this document provides a way forward.

Where there is a need to further delineate the bus by size in terms of seated capacity, this document uses what is known in the industry as a small (SB), medium (MB) and large bus (LB). This will be determined by need and/or the limitations on vehicle design or performance characteristics.

Small bus (SB)	13-21 seated passengers and including the driver
Medium bus (MB)	21-39
Large bus (LB)	over 39

References are to all bus sizes unless specifically noted as to the size category in the relevant sections that follow.

Regional councils are reminded that if they wished to make these requirements mandatory for commercially registered services they must use the process for the imposition of conditions provided in the Public Transport Management Act 2008.

## Section two: Design and performance

### 2.1 Introduction

The chassis must be fit for purpose as required by the Heavy Vehicles Rule. The chassis shall be of a design and use protective material or techniques such that a bus can be expected to give 20 years reliable life under normal high-intensity urban operational conditions of service, without incurring major structural failures or the need for major overhaul requirements due to operating, roading and environmental conditions excluding those that are attributable to vehicle crashes.

### 2.2 Maximum vehicle age and fleet average age profile

The maximum permitted vehicle age <21 years. Note: this applies to all vehicles irrespective of whether they are new to urban service or existing buses.

#### Guidance

The desired fleet profile for an urban bus company is:

from the date of the introduction of these requirements, ie 1 January 2010:  $\leq 12.5$  average years

from the above date plus five years ie 1 January 2015:  $\leq 10$  average years.

### 2.3 Engine

All sizes.

Acceleration	0-20 km/h $\leq 4$ seconds. 0-50 km/h $\leq 30$ seconds.
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#### Guidance

Range without refuel	$\geq 350$ km or 15 hours.
Emission	Current Vehicle Exhaust Emissions Rule.
Noise	Current Vehicle Equipment Rule.
Compartment insulation	Non-flammable, noise and heat insulation material. Fire retardancy ISO 3795 (1998) or FMVSS 302 US standard.

### 2.4 Transmission

SB	Fully automatic or electronic shift.
MB and LB	Fully automatic or electronic shift plus retarder.

## 2.5 Suspension

SB	Air suspension including kneeling capability is desirable.
MB and LB	Air suspension. ECAS-electronically controlled including self-levelling. Kneeling at front door $\geq 60$ mm drop/lift, driver controlled with in-use indicator/drive-off protection.

## 2.6 Stability and steering

MB and LB	ESC-electronic stability control is desirable.
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## 2.7 Braking

MB and LB	Must meet a brake standard as required by the Heavy Vehicle Brakes Rule. EBS and ABS-electronically controlled braking system with brake blending and anti-lock braking system. Vehicle movement above 5 km/h is inhibited while rear door is open or the kneeling system is activated.
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## Section three: Access

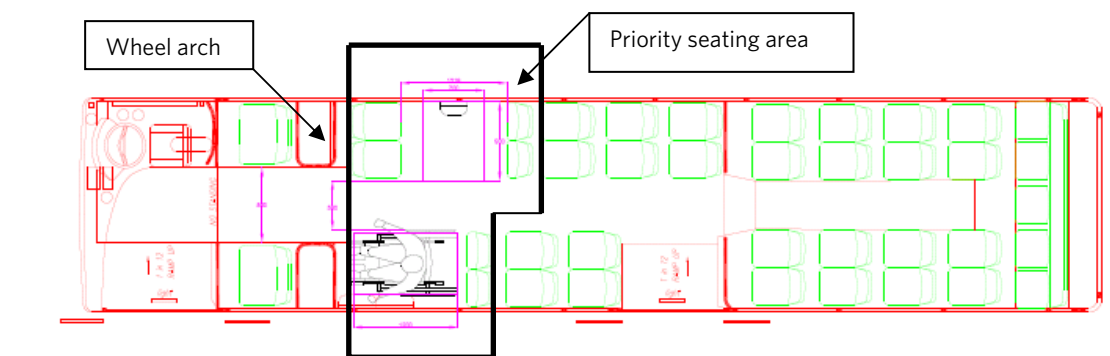
### 3.1 Introduction to the priority seating area

The ease and speed of accessibility for passengers of all ages, sizes, capability and mobility while boarding or alighting a vehicle, as well as movement within the vehicle, is of prime importance because:

- it removes the perceived barrier that buses cannot be easily used by all members of the public regardless of any physical, sensory or cognitive impairment
- boarding and alighting times are much reduced, which can have a significant impact on the overall travel times and consistency of journey time of a bus service when compared with that of the alternative choices, ie using a private or company vehicle.

The priority seating area is a key concept in achieving this accessibility. The priority seating area is located well to the forward end of the saloon, typically immediately to the rear of the front wheel arches, and encompasses a minimum of one space for a wheelchair user and at least four seating positions on the offside. Its purpose is to provide space for a wheelchair user and seating for those with physical, sensory and cognitive impairments and parents/caregivers with children.

The picture below shows the general location of the priority seating area. It is not intended to show the ideal layout. For an LB, a minimum of one forward or rearward facing wheelchair space to accommodate a wheelchair with a footprint of  $\leq 700$  mm width x  $\leq 1200$  mm length and its user shall be provided (for more detail see section six).



This arrangement will need to be certified by a specialist certifier (viz a vehicle inspector or inspection organisation appointed for this purpose under the Compliance Rule) prior to issuing a Certificate of Loading. Note: It is up to the vehicle owner to provide an Urban Bus Construction Design Certificate from the specialist certifier to the entry certifier when the vehicle is submitted for its first Certificate of Fitness (CoF). The specialist inspection and certification will include:

- compliance with the dimensions of the priority seating area as set out in this document
- the determination of seating arrangements under various loading conditions, eg with folding seats down and no wheelchair; any standing passengers in this area; arrangements when a wheelchair is in position
- checking that the vehicle is safely loaded under all loading conditions in accordance with the PSV and Compliance Rule
- confirmation that the wheelchair restraint meets the relevant Australian standard or complies with the alternative general safety requirements in section 8.4 of the PSV Rule



- confirmation that provisions for people with vision/hearing impairment meet the requirements of this document
- confirmation that there is safe and clearly labelled provision for emergency exit under all conditions of loading
- confirmation that ramps are designed and constructed to minimise risk of injury to any person.

Guidance	Definition
Plinth	Raised small step/platform/area within the bus saloon above the level of the central aisle that makes access easier to seats, particularly those that may be mounted onto the wheel arches rather than to the floor or bus sidewall.
Wheel arch	The covered protective flooring structure directly above the front and rear wheels/axles of the bus. The front wheel arches particularly must allow the suspension and steering action of the bus to fully function.
Parent/caregiver and child seat	A bench style seat of a narrower width than the normal double bench seat which may permit a parent/caregiver and child to sit side-by-side, often used on or forward of the front wheel arch in conjunction with the need to provide a wider aisle for wheelchair/mobility device/pram access.

Doors and aisle width, step heights, interior floors, seating configuration and revenue collection all impact on accessibility.

For the purpose of this document, it is assumed that boarding and revenue collection for all passengers of any capability, including those using wheelchairs, is through the front door. Alighting and any electronic revenue system using 'tag on-tag off' may be through either door, although the NZTA is aware that some regional councils currently intend to restrict electronic ticketing system 'tag on' to the front door only.

Some of these things have been put in place by regional authorities to provide accessibility but this is the first time clear, achievable requirements have been set nationally.

### 3.2 Doors

Number	SB MB LB	One One. Note: Two desirable if $\geq 30$ seats. Two Larger vehicles that will be used on longer-distance urban express/limited stop style services may use only one door.
Location		Front door shall be as close to the front of the bus as possible, preferably forward of the front axle and immediately opposite and in full view of the driver.
Widths	Front door SB MB/LB Rear door	Clear space excluding any grab handles on the door. $\geq 850$ mm single leaf $\geq 1000$ mm double leaf $\geq 700$ mm single leaf

Note: In addition to the doors for entrance and exit there must be adequate provision for emergency exit as stated in section 5 of the Passenger Service Vehicles Rule 1999.

### 3.3 Step height/depths

#### Height

First step	Measured from the ground to top of step nosing (without kneeling in operation)
SB	≤ 300 mm
MB/LB	Front ≤ 370 mm Rear ≤ 370 mm With kneeling: Front ≤ 280 mm
Any additional steps including aisle or seat plinths	Steps (maximum two) ≤ 220 mm Plinths ≤ 200 mm Step depths ≥ 300mm

### 3.4 Floors

All floor surfaces shall use a non-slip material. Front and rear door entry/exit areas and the priority seating area shall have a colour contrast to the flooring material in the main saloon. The colour contrast for the front and rear door entry/exit areas should be the same as the colour contrast in the priority seating area.

#### Guidance

Royal New Zealand Foundation for the Blind (RNZFB) and the Association of Blind Citizens of New Zealand recommend a 70% minimum visual contrast (refer to Road and Traffic Standard Series RTS 14: Guidelines for facilities for blind and vision impaired pedestrians (Revision 2, 2009)(section 4.3).

SB	Flat floor from front entry to rear of priority seating area and desirably to immediately forward of rear axle.
MB/LB	Flat floor from front entry to rear door or immediately to front of rear axle if only one door.  Behind the rear door or rear axle stepped (maximum two) or sloping floors are acceptable.

A gradual transverse axis sloped area in the front entrance to the edge of the fare paying area adjacent to the driver is permitted but not preferred.

Maximum slope 1 in 12.5 (section 3.2 of Passenger Service Vehicles Rule 1999).

### 3.5 Aisle width

Front door entrance, fare paying and turning area, and unimpeded through to rear of priority seating area – ≥760 mm. The swept path from the front entrance to the aisle shall accommodate a wheelchair/mobility device/pram of ≤ 700 mm width x ≤ 1200 mm length, with an allowance for clearance.

Rear of priority seating area for remainder of flat floor area/to rear door – ≥440 mm.

### 3.6 Seating configuration

The NZTA appreciates that different urban operations and chassis design configurations may demand different seating configurations. Seats shall face forward (preferred choice for most passengers) or rearward. Wide single parent/caregiver and child, double and wider three or more person bench style may be used.

However, to ensure passenger confidence along the route as well as speedy accessibility:

- $\geq 60\%$  of the total seated capacity of the bus shall be forward facing (the majority of the forward facing seats may be towards the rear)
- $\geq 50\%$  of the seats in the priority area shall be forward facing.

Note that section 6.6 of the Passenger Service Vehicles Rule 1999 requires that a passenger service vehicle must be designed and constructed to ensure the chassis ratings are not exceeded; and at least 25% of the actual weight is carried on the front axle or front axle combination; and no component overloading will occur.

To increase the standing/seated passenger ratio and to facilitate wheelchairs/mobility devices/prams, forward and rearward folding seating is allowed, but if this seating does not comply with section 4.2(2) of the Passenger Service Vehicles Rule 1999, an exemption must be applied for.

See section six for further details related to priority seating and wheelchair carriage.

Seat spacing between forward-facing seats shall be  $\geq 670$  mm.

#### Guidance

Seat height:

- The height from the floor to the top of the front of the seat cushion should be  $\geq 400$  mm and  $\leq 500$  mm.
- RNZFB recommend 450-500mm as this would better suit elderly clients with mobility limitations.
- The height to the top of the seat back excluding any grab handle should be  $\geq 900$ mm.

### 3.7 Seating

Changes in population demographics means many of our passengers are getting heavier, bigger/wider, older and less mobile, so good easily accessible seating is a requirement for passengers be they short distance hop on hop off or using the longer suburban routes and express/motorway services which may mean a journey of up to an hour.

Seating shall consist of a fabricated frame or moulded shell. The fabricated frame or moulded shell shall support or contain a flat bench style or minimally contoured to body shape squab, or padded insert style seat.

All materials shall be vandal, fire, stain and odour resistant. They shall also be hard-wearing and easy to clean.

Seat width	single seat	$\geq 425$ mm
	double bench or paired	$\geq 875$ mm
	parent/caregiver and child, on front wheel arch	$\geq 810$ mm
Spacing	forward facing	$\geq 670$ mm

### 3.8 Luggage/stroller/prams/mobility devices

The safe provision of baggage, freight and pushchairs is provided for in section 6.8 of the Passenger Service Vehicles Rule 1999.

#### Guidance

Provision can be toward the front of the saloon area for easy access/safe/secure storage of:

- luggage, ie suitcase, carryall, backpack or similar package
- folded pram/stroller/mobility frame/aids
- folded wheelchair.

The area above the wheel arches immediately above both front wheels is in most configurations the most suitable luggage location but alternatives behind modesty panels at the front or rear door are also acceptable.

In total, sufficient space may be provided to accommodate 2 x folded prams/strollers/mobility frames and 2 x pieces of luggage, each of the luggage pieces being capable of being carried by one person, eg  $\leq 25$  kg with dimensions  $\leq 800$  mm x  $\leq 300$  mm.

## Section four: Vehicle interior, entrance and exit

### 4.1 Introduction

Although the Passenger Service Vehicles Rule 1999 includes requirements for handrails, handholds and handgrips, energy absorbent padding and lighting, this document suggests additional requirements to ensure passenger safety.

### 4.2 Step and plinth edges

All steps at door entry and exits or within the vehicle shall have full width step edges and faces fitted with a distinctive high-visibility, non-slip/trip style nosing in a solid band, contrasting with the immediately adjacent flooring material.

#### Guidance

RNZFB and the Association of Blind Citizens of New Zealand recommend a 70% minimum visual contrast (refer to RTS14 section 4.3).

RNZFB and the Association of Blind Citizens of New Zealand recommend the use of safety yellow as the colour that is most easily distinguished by the visually impaired.

The nosing dimensions in the horizontal and vertical planes should be within the range 45-50 mm in width (UK Public Service Vehicles Accessibility Regulations 2000).

Plinths shall have a minimum of similar nosing on the horizontal edge, and should also cover the vertical face.

Sharks-tooth style reduces the contrasting effect by half so is unacceptable.

### 4.3 Stanchions/handrails

Vertical high-visibility contrasting colour stanchions from either floor to ceiling or seatback to ceiling, as location dictates, shall be fitted throughout the length of the bus and close to, but not impede movement along, the aisle so that they are spaced at alternate seats left and right of the aisle, and a passenger can walk/move the length of the bus while able to hold a stanchion with one hand at all times.

Additional stanchions shall be provided immediately adjacent to doorways and in priority seating or wheelchair areas if not already fitted as above.

In areas where seating may have been reduced to provide for more people to stand, priority seating or wheelchair positions, or is of the folding style, then overhead contrasting colour handrails shall be provided.

Stanchions, handrails and grab handles must meet the requirements of section 6.9 of the Passenger Service Vehicles Rule 1999 (section 6.9).

#### Guidance

For contrast refer to guidance for step and plinth edges.

Overhead contrasting colour handrails should be no higher than 1900 mm from floor level.

Stanchion/handrail maximum cross-section dimension should be in the range of 30-35 mm and should be of a circular or elliptical cross section (UK Public Service Vehicles Accessibility Regulations 2000).

For handrails, they should have a clear space of not less than 45 mm between any part of the vehicle and all parts of a handrail other than its mountings (UK Public Service Vehicles Accessibility Regulations 2000).

Deep knurling is not encouraged for general cleanliness and hygiene reasons.

## 4.4 Grab handles

As with stanchions and handrails, all grab handles shall be of the same high-visibility contrasting colour material.

### Guidance

For contrast refer to guidance for step and plinth edges.

Grab handles should have a circular or elliptical cross section of 30-35 mm on the maximum section (refer to UK Public Service Vehicles Accessibility Regulations 2000).

In the fare paying area, grab handles (if used) should be in close proximity to the handrail, or a continuation of the handrail at the door entrance.

The Hamilton Accessibility Pilot Team recommends that grab handles to the side of the wheelchair user be at least 700 mm in length.

In addition to the grab handles required to be fitted to doors, grab handles shall be provided in the following locations:

- the priority seating area; located to be readily accessible to any seated or wheelchair passengers, ie an extra long ( $\geq 700$  mm) grab handle mounted horizontally on the bus side wall
- fare paying area
- integral to all seatbacks (except for rearmost seats) on the aisle side of any forward or rearward facing seat and should be such that there is  $\geq 45$  mm finger clearance to the handle
- on the underside of any folding seat located to provide a firm handle to any wheelchair passenger when manoeuvring into, out of or occupying a wheelchair space.

## 4.5 Lighting

Lighting must be adequate as per section 6.15(3) of the Passenger Service Vehicles Rule 1999.

In addition, for the purpose of these requirements, the following lighting should be provided:

- For the internal entry and exit doorway step areas and externally downwards and outwards for 500 mm beyond the step edge to a level of  $\geq 100$  lux. Extinguished on door closure and prior to moving off.  
Note: RNZFB recommends this is measured at ground level to ensure maximum visibility.
- Fare paying area  $\geq 65$  lux. Extinguished on door closure and prior to moving off.
- General saloon - to minimise windscreen reflections, light levels forward of the priority seating area  $\leq 12$  lux, remainder of the saloon behind the priority seating area  $\geq 20$  lux.

## 4.6 Security

Provision for suitable cable ducting and mounting points to allow for the subsequent installation of internal CCTV automatic security/video cameras shall be provided:

SB	One located immediately forward of the driver to view the fare paying and saloon areas.
MB and LB	Two, one located as above and the second close to rear door or rear axle area.

## 4.7 Heating, ventilation and air conditioning

Refer to section 6.3 of the Passenger Service Vehicles Rule 1999.

Guidance	
All buses	An adequate heating system with opening windows and/or air conditioning to maintain a desirable temperature.

## 4.8 Demisting

Refer to section 6.10 of the Passenger Service Vehicles Rule 1999.

## Section five: Communication

### 5.1 Introduction

Section 6.12 of the Passenger Service Vehicles Rule 1999 requires that there be a means of communication with the driver, but is not specific. In this section better requirements are set out. Requirements for the external destination display are also set out.

In addition, the Passenger Service Vehicles Rule 1999 was amended to include sections 8.5 and 8.6 allowing the provision of facilities for hearing or vision impaired passengers. This section of the document provides more requirements.

### 5.2 Bus stopping signals

All buses shall be fitted with twin driver indicator bus stopping signalling and acknowledgement display devices that are easily seen by the driver and the passengers, and in easy reach of all passengers whether seated or standing. Generally, this means they should:

- be easily reached by any person seated in a priority seating area or wheelchair area without having to stand up, eg on side walls or the underside of folding seats
- be used by elderly and disabled people with poor hand and finger function or dexterity
- be adjacent to and not less than every second row of seats on both sides of the aisle.

The dashboard indicator shall have two components: one a general signal, and a second to indicate to the driver that the signal has been made by a passenger occupying a wheelchair or priority seating position.

The device shall trigger both an audible and visual indication to the driver and passenger. For the passenger saloon there shall be at least one illuminated 'Bus stopping' sign (as shown, a mix of upper and lower case characters is best) rearward facing to the saloon to acknowledge the request. This sign shall remain illuminated until cancelled by the operation of the door controls.

Bus stopping request devices shall be of a high-visibility contrasting colour to the surround and with the surface on which surround is mounted and may take the form of a mix of the following:

- Finger/thumb/knuckle push buttons on the vertical stanchions at a height of  $\geq 1300$  mm and  $\leq 1600$  mm above floor level.
- Finger/thumb/knuckle push buttons on the bus side panels at a height of  $\geq 850$  mm and  $\leq 1050$  mm particularly in the priority seating area or on the undersides of folding seats.
- Horizontal cordage along the windows of each side of the bus at a height  $\geq 1200$  mm above floor level.  
Note: Cordage alone is not acceptable.

Due to the incidence of false signal calls experienced with many full/large palm push style call systems, these are not recommended.

#### Guidance

RNZFB recommends that high contrast and consistent colours should be used, such as a red button on yellow background.

RNZFB and the Association of Blind Citizens of New Zealand recommend that except for the first letter, all letters should be in lower case. When signs are written in upper case letters, they cannot be read easily by vision-impaired people.



The Hamilton Accessibility Pilot Team recommends, for the wheelchair space, that bus stopping buttons are placed to the side of the seated passenger and behind the grab handle.

### 5.3 External destination display

Clear information of the bus route, destination and intermediate points form an essential part of generating passenger confidence.

Signs shall be of the electronic matrix style with emphasis on high visibility during all light levels that can be easily read by the majority of sighted current or potential passengers as the bus approaches or departs. Signs should have the capability to display multi-line information in a mix of upper and lower case characters and also frequently changing displays to facilitate additional route information, eg via station.

The sign must be controlled by the driver from the driving position and be capable of storing a range of different route and destination information as well as displaying whether the bus is not in service, on charter, school or special work.

All buses shall have the following signs:

- Front forward-facing three route number and destination combination sign  $\geq 1500$  mm wide located at or above the top of the windscreen.
- Near side, as close as possible to the front entrance, a 'destination only' at a height  $\geq 1200$  mm from ground level.
- Rearward-facing route number only sign at a height  $\geq 1500$  mm and  $\leq 2500$  mm above ground level and central or left of centre, ie toward the nearside of the bus.

SB	<p>Front and rear route number characters shall be <math>\geq 125</math> mm.</p> <p>Front destination characters shall be <math>\geq 100</math> mm.</p> <p>Side destination number characters shall be <math>\geq 60</math> mm.</p>
MB/LB	<p>Front and rear route number characters shall be <math>\geq 150</math> mm.</p> <p>Front destination characters shall be <math>\geq 125</math> mm.</p> <p>Side destination characters shall be <math>\geq 60</math> mm.</p>

Guidance	
High visibility	Association of Blind Citizens of New Zealand recommend that high visibility signs be set at a 70% minimum visual contrast (refer to RTS14 section 4.3).
Dot matrix	RNZFB and Association of Blind Citizens of New Zealand advise that dot matrix signs are not easily read by someone with low vision.
Route numbers	<p>Route numbers should be consistently displayed in a large font to the left of the display when viewed from the roadside.</p> <p>It may also be helpful for passengers to be able to view the route number on the side display.</p>

Use of upper/lower case	RNZFB and the Association of Blind Citizens of New Zealand recommend that except for the first letter, all letters should be in lower case. When signs are written in upper case letters, they cannot be read easily by vision-impaired people. The exception to this would be place names such as Lower Hutt, North City.
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## 5.4 Internal information

### PA system

A PA system capable of broadcasting driver announcements and pre-recorded messages shall be provided.

### Electronic information displays and announcements

Ducting and suitable mounting points to enable later fitment of 24V automated progressive route and journey-related information and announcements equipment shall be provided.

#### Guidance

People with hearing impairments represent a large proportion of the New Zealand population (approximately 400,000 people). Approximately 250,000 New Zealanders' hearing impairment is classified as serious enough to constitute a disability.

Progressive route and journey-related information presented on an electronic information display provides vital information on the route being taken and the current location of the bus. This information provides confidence to the user and helps to ensure they do not find themselves getting off at the wrong stop which also may present safety issues, particularly at night.

Similarly, for the visually impaired, audible announcements via electronic information equipment have been successfully trialled as part of the Hamilton Accessibility Pilot. The Hamilton Accessibility Pilot Team also trialled journey-related information presented on an electronic display. Findings from the trial suggest colour contrast is important on the visual display. Angle of the screen and screen quality is important to reduce glare. Text size needs to be readable. Text and background colour should clearly contrast. The audio announcements should focus on place names as opposed to street addresses and numbers.

A submission from the Hearing Association also commented on the usefulness of displaying the fare electronically in the fare paying area (as part of the ticket machine or via a separate display) so that the customer is aware of the correct cash fare to be paid.

The NZTA encourages regional councils to consider the implementation of these systems to cater for those with hearing and visual impairments (and for the wider benefits that such systems may bring for other passengers) where feasible, and to consider lower cost alternatives that may present themselves in the marketplace.

## 5.5 Driver operational communication

For an urban fleet service requiring more than five buses in service at any one time, a two-way radio shall be provided to provide communication between buses of the same operator, back to base depot and to any central information or control centre.

For the smaller regional centres, a hands-free cell phone is an acceptable alternative providing the operator can provide evidence of a company safe driving policy that its drivers must follow with respect to hands-free use.

## Section six: Facilities for passengers with impairments

### 6.1 Introduction

The Passenger Service Vehicle Rule 1999 was originally non-specific as regards the provision of special equipment for people with impairments. This was extended, and section 8 of the Rule now covers the requirements for the provision of signs, tactile surfaces and public address systems. More detail is given than the Rule in this section of the document.

### 6.2 Priority seating area

Provision shall be made as follows for passengers with physical, sensory or cognitive impairments:

- Priority seating area well to the forward end of the saloon with at least four preferably all forward facing seats identified for passengers with impairments or extra mobility needs. These seats may be of the folding type in order to facilitate wheelchair access and stowage.
- A separate space of dimensions not less than 800 mm by 1300 mm to cater for a wheelchair with a footprint of  $\leq 700$  mm width x  $\leq 1200$  mm length and its user (see section 6.3).
- Signage to indicate the area and request to vacate seats for use by passengers with disability/mobility needs along the following lines:
  - 'Priority seating area - Please vacate these seats for elderly or disabled passengers or parents/caregivers with small children.'

Minimum front door and aisle widths, initial step heights and fare paying areas have been already specified in section three and make due allowances for access.

### 6.3 Wheelchairs

Wheelchairs are described as both manual self/caregiver propelled or powered versions of preferred characteristics as follows:

- Indicative combined weight of wheelchair/mobility device and user  $\leq 240$  kg (information for Certificate of Loading).
- Footprint to be provided for forward or rearward facing stowage  $\leq 700$  mm width x  $\leq 1200$  mm length.
- If transverse stowed, with handles and foot rest capable of being folded or stowed  $\leq 700$  mm width x  $\leq 900$  mm length.

Space shall be provided, as part of the priority seating area, for the carriage of an occupied wheelchair/pram as specified above as follows:

SB/MB	To carry one wheelchair, forward or rearward facing.
LB	To carry a minimum of one wheelchair, forward or rearward facing (preferably on the nearside).

#### Guidance

A second wheelchair space could be provided at the discretion of regional councils and/or operators. This may be transverse facing utilising folding seats that can be used by other passengers when the wheelchair space is not occupied by a wheelchair user. The wheelchair space should not cause the wheelchair user and wheelchair to significantly encroach into the aisle space beyond the normal bench seat width and therefore creating a potential hazard to other passengers.

An aisle width of  $\geq 760$  mm to the back of the priority seating area impacts on the amount of width available for priority seating in the forward saloon area, that is, behind the front wheel arches. A second forward or rearward facing wheelchair space or larger aisle ( $\geq 760$  mm) may mean that the priority seating provided for other passengers with physical, sensory or cognitive impairments and parents/caregivers with children will have to be located further down the back of the bus.

Wheelchair and wheelchair-occupant restraints are in section 8.4 of the Passenger Service Vehicles Rule 1999.

#### Guidance

If a Rule incorporates a standard by reference, the technical specifications effectively form part of the Rule. The Passenger Service Vehicles Rule 1999 incorporates joint Australian and New Zealand standards relating to wheelchair hoists, ramps and restraints. If these standards cannot be complied with there are general safety requirements which are an alternative.

The wheelchair must be restrained as per the standard incorporated in the Passenger Service Vehicles Rule 1999 (refer to section 8.4 of the Rule), but the user may not need to be restrained depending on the health of the user and the strength of the wheelchair.

#### Guidance

Wheelchair restraint requirements are partly to stop the wheelchair from rolling around the vehicle, and in some cases they are able to protect the occupant if the wheelchair is strong enough.

An international wheelchair symbol for accessibility sign shall be provided on the bus internal side wall of any wheelchair space. Signage shall also request the vacation of any seats in the wheelchair space to enable the area to be used by a wheelchair user. This may be part of the priority seating area signage.

Externally two international wheelchair symbols for accessibility shall be provided, one on the front left of the bus and one on the side of the bus by the front door entrance.

## 6.4 Boarding or alighting

In sections 2.5 and 3.3, the requirement for the bus to kneel at the front door is specified as this can be of benefit to many passengers whether on foot, with or without an impairment, in a wheelchair or accompanied by one or more small children.

MB/LB shall have a kneeling capability.

The following shall be provided on the exterior of the bus adjacent to the front door:

- A sign stating 'This bus kneels on request', and
- A kneel/wheelchair ramp request call button, and in contrasting colours to the immediate surrounds.

## 6.5 Ramp

A manually operated flip-over style ramp shall be provided at the front door that can be deployed and recovered by the driver on request from wheelchair, pram users or any other impaired passengers where the kneeling facility proves to be insufficient. Ramps must comply with section 8.2 of the Passenger Service Vehicles Rule 1999.

### Guidance

A powered ramp may be fitted provided it meets the requirements of section 8.2 of the Passenger Service Vehicles Rule 1999.

In the unlikely event that the driver fails to deploy the ramp, passengers can use the kneel/wheelchair ramp request call button.

## Section seven: Driver compartment

The role and responsibility of the urban bus driver in coping with the levels of urban traffic and congestion, the various requirements of passenger loading, revenue collection, unloading and dealing with the range of passenger requests for assistance and information is a demanding one. Any features that make the task easier and safer to carry out will be to the overall benefit of the public bus transport industry.

### Guidance

The bus driver's compartment is part of his/her workplace and they can spend the majority of their working day in that compartment.

### Features

In addition to any overall bus heating and ventilation or air conditioning system, provision can be made to provide the driver with some personal driver-controlled form of heat and cooling, including to the foot area.

### Comfort

- A fully sprung driver's seat with adjustment for all three planes of driving position.
- For MB and LB, the driver's seat suspension should be capable of being adjusted to cater for varying driver weight.
- A readily adjustable (tilt and height) steering wheel column and soft style easily cleaned and dried steering wheel.
- A footrest for the left foot.
- Coat/jacket storage, eg hook.
- Out-of-sight storage for personal belongings such as bag/lunchbox.
- Ticketing equipment and till stand should be ergonomically located.

### On-board security

- Barrier protection panel immediately behind the driver to prevent any form of assault from behind, either directly by a passenger or by a thrown object.
- A revenue collection and holding system so that the driver's cash can be readily and securely locked into a cash box that can be secured to the bus, eg to the ticket issuing equipment stand.

## Section eight: Existing buses

### 8.1 Introduction

There are a large number of buses used in the urban bus fleets that have been purchased over the last 20+ years. Some of the more recent ones will meet or exceed all or most of the criteria listed in this document for new buses, but many of the earlier purchases will not.

The NZTA encourages operators to speed up the replacement of the older less user or environmentally friendly vehicles, and to retrofit as many of the features in the previous sections as is possible.

### 8.2 Existing bus standards

By 1 January 2014 all used buses (a bus registered in New Zealand prior to 1 January 2009) used in urban services, at a minimum, shall meet the following requirements:

Acceleration	0-20 km/h $\leq$ 5 seconds 0-50 km/h $\leq$ 30 seconds
Emission	If purchased before 2000, all diesel buses that do not meet the Euro 2 standard or equivalent shall fit particulate filters where it is feasible to do so.
Transmission	MB/LB automatic
Suspension	MB/LB Full air with levelling
Doors	SB/MB 1 LB 2 desirable if $\geq$ 30 seats Front door width $\geq$ 700 mm
Step height	$\leq$ 370 mm
Additional steps or seat plinths	$\leq$ 230 mm
Floor and levels	Non-slip material in boarding and aisle area. No more than two steps in the aisle along whole internal length of vehicle.
Step edge	Highlighter to top edge of nose.
Stanchions/handrails	One close to each door plus at least two in each saloon area, ie forward of rear door and behind rear door.
Grab handles	On aisle side of all seat backs.
Heating and ventilation	Drivers area plus $\geq$ 2 saloon heaters.
Demisting	Front windscreen and front door windows.

Bus stop request	Bell push or cord within reach of seated and standing passengers in every second row of seats.  Illuminated 'Bus stopping' display.
Destination	Front route no - three characters $\geq 100$ mm in height.  Front and side destination characters $\geq 60$ mm in height.
Luggage	Space allocated towards the front of the vehicle to safely stow 2 x folded prams or 1 large backpack/suitcase or similar sized piece of luggage or package.

Guidance	
Range without refuelling	$\geq 300$ km or 15 hours operation