



A sub-project within the framework for Partner
Cooperation

BUSS 2014 COMMON SECTOR FUNCTIONAL REQUIREMENTS FOR BUSES

**Adopted by the Partner Cooperation Steering Committee
for improved Public Transport
September 2014**



SVENSKKOLLEKTIVTRAFIK

**SVERIGES
BUSSFÖRETAG**

How to use the document

Bus 2014 specifies the functional requirements that the sector has agreed to jointly as being of interest to passengers and which apply over and above current legislation. The purpose of Bus 2014 is that it shall serve as a standard for procurements of bus traffic in Sweden. The Swedish Public Transport Association and the Swedish Bus and Coach Federation therefore recommend that purchasers do not make any exceptions but that they use this document in its entirety. The document constitutes an enclosure to the model agreements that have been drawn up by the Partner Cooperation, www.partnersamverkan.se

The common sector standard we present in this document can be subdivided into four different categories:

- Applies to all buses (regardless of the bus registration date)
- Applies to buses that were put into operation for the first time on 1 January 2010 or later (the bus registration date).
- Applies to buses that were put into operation for the first time on 1 July 2012 or later (the bus registration date).
- Applies to all buses put into operation for the first time on 1 July 2015 or later (the bus registration date).

Of the four age categories that are listed above, the last three are dependent on when the recommendation was introduced in the previous versions of this agreement enclosure. The date specified indicates the first registration date on which the recommendation in question applies.

ENVIRONMENTAL REQUIREMENTS, ETC.

For common sector recommendations with respect to environmental requirements, such as fuel, emissions, energy efficiency and noise, etc., reference is made to the most recently published common sector document entitled *Environmental requirements in connection with transport procurement*, which can be downloaded at www.partnersamverkan.se

ENCLOSURES

Enclosure 1 contains definitions.

Enclosure 2 contains a collection of links.

Enclosure 3 is a descriptive document that is primarily directed at vehicle manufacturers in which we describe in more detail what is intended to apply in different functional requirements.

List of requirements

Click here to write! ➔

Client: _____ Area/Procurement: _____

Insert a cross in the box:

We follow all the common sector recommendations that the agreement enclosure refers to

Or insert a cross for the question concerned:

The client indicates those requirements that apply in the procurement in question by clicking in the column below:

KAPITEL	Sida	Bransch-gemensamma rekommendationer för bussar i trafik	Krav i denna upphandling för bussar i trafik
1 TRYGGHET & SÄKERHET	1.1 Kameraövervakning – generellt	8	<input checked="" type="checkbox"/>
	1.2 OPTION Kameraövervakning – trygghetsövervakning av passagerarutrymmet	8	<input type="checkbox"/>
	1.3 Nödutrustning	8	<input checked="" type="checkbox"/>
	1.4 Alkolås – i form av alkolås eller alkoskåp	9	<input checked="" type="checkbox"/>
	1.5 Inre övervakning	9	<input checked="" type="checkbox"/>
	1.6 Automatiskt släckningssystem i motorrum	9	<input checked="" type="checkbox"/>
2 SITTPLOTS	2.1 Bilbälte	10	<input checked="" type="checkbox"/>
	2.2 Audiovisuell bilbältespåminnare	10	<input checked="" type="checkbox"/>
	2.3 Armstöd	10	<input checked="" type="checkbox"/>
	2.4 Rullstolsplats	10	<input checked="" type="checkbox"/>
	2.5 Utformning av rullstolsplats klass A, B och II	11	<input checked="" type="checkbox"/>
	2.6 Utsikt genom fönster	11	<input checked="" type="checkbox"/>
	2.7 Solskydd	11	<input checked="" type="checkbox"/>
	2.8 Placering av säten	12	<input checked="" type="checkbox"/>
	2.9 Höjd på säten	12	<input checked="" type="checkbox"/>
	2.10 Mått för säten	12	<input checked="" type="checkbox"/>
	2.11.1 Avstånd mellan reserverade sittplatser	13	<input checked="" type="checkbox"/>
	2.11.2 Avstånd mellan reserverade sittplatser placerade mitt emot varandra	13	<input checked="" type="checkbox"/>
	2.12.1 Höga ryggstöd	13	<input checked="" type="checkbox"/>
2.12.2 Lutningsbara höga ryggstöd	14	<input checked="" type="checkbox"/>	
3 PÅ- OCH AVSTIGNING	3.1 Dörröppning/stängning	15	<input checked="" type="checkbox"/>
	3.2.1 OPTION Visering vid påstigning	15	<input type="checkbox"/>
	3.2.2 Två dörröppningar	15	<input checked="" type="checkbox"/>
	3.2.3 Ledbuss med tre dörröppningar	15	<input checked="" type="checkbox"/>
	3.3 Kontrastmarkering vid in- och utsteg	16	<input checked="" type="checkbox"/>
	3.4.1 Golvkonstruktion för val av ingångsdörr för rullstolsresenär	16	<input checked="" type="checkbox"/>

KAPITEL	Sid	Bransch-gemensamma rekommendationer för bussar i trafik	Krav i denna upphandling för bussar i trafik
3 PÅ- OCH AVSTIGNING	3.4.2 Ingång för rullstolsresenär vid förarplats eller annan dörröppning	17	✓ Kryssa i nedan!
	3.4.3 Podesterhöjd	17	✓ <input type="checkbox"/>
	3.4.4 Fotstegshöjd	17	✓ <input type="checkbox"/>
	3.5 Ledstänger och handtag	17	✓ <input type="checkbox"/>
4 ÖVRIG KOMFORT	4.1.1 Plats för barnvagn	18	✓ <input type="checkbox"/>
	4.1.2 Antal barnvagnsplatser (läggolv)	18	✓ <input type="checkbox"/>
	4.1.3 OPTION Antal barnvagnsplatser	18	<input type="checkbox"/>
	4.2 Belysning	18	✓ <input type="checkbox"/>
	4.3 Ventilation	19	✓ <input type="checkbox"/>
	4.4 Elkontakt	19	✓ <input type="checkbox"/>
	4.5 OPTION Toalett	19	<input type="checkbox"/>
5 INFORMATION & KOMMUNIKATION	4.6 Bagagehylla - läggolv	19	✓ <input type="checkbox"/>
	5.1.1 Linje- och destinationsskyltar - allmänt	20	✓ <input type="checkbox"/>
	5.1.2 Linje- och destinationsskyltar - front	20	✓ <input type="checkbox"/>
	5.1.3 Linje- och destinationsskyltar - framdörr och bak	20	✓ <input type="checkbox"/>
	5.1.4 Utvändig högtalare	20	✓ <input type="checkbox"/>
	5.2.1 Automatiskt resenärsinformation	21	✓ <input type="checkbox"/>
	5.2.2 Annan resenärsinformation	21	✓ <input type="checkbox"/>
	5.2.3 Signalknapp	21	✓ <input type="checkbox"/>
	5.2.4 Signalknapp/påkalla förarens uppmärksamhet	22	✓ <input type="checkbox"/>
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5.2.6 Trådlös internetaccess (wifi)	22	✓ <input type="checkbox"/>	
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7 FÖRARMILJÖ	7.1 Ergonomi	24	✓ <input type="checkbox"/>
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	7.3.1 Kameraövervakning påstigande	25	✓ <input type="checkbox"/>
	7.3.2 Hands-free mobiltelefoni	25	✓ <input type="checkbox"/>
	7.3.3 Siktanordning	25	✓ <input type="checkbox"/>
	7.3.4 Varningssystem allvarigt fel	26	✓ <input type="checkbox"/>
	7.3.5 Bälte	26	✓ <input type="checkbox"/>
	7.3.6 Dörrbroms	27	✓ <input type="checkbox"/>
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3.4.2 Ingång för rullstolsresenär vid förarplats eller annan dörröppning	Krav i denna upphandling för bussar i trafik:
Alla resenärer går ombord vid föraren	<input type="checkbox"/>
Resenär i rullstol eller med barnvagn tar sig ombord genom annan dörröppning	<input type="checkbox"/>



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Foreword

The bus is an extremely important means of transport in the Swedish public transport system. Almost every other journey within public transport is made by bus. It is thus obvious that the functional requirements we apply in the case of buses within the sector must be based on the needs of the passengers. They must be requirements that mean we feel is a secure, safe, comfortable and simple matter to make journeys by bus.

Many requirements for fulfilling these goals are regulated by provisions in current legislation. The most important item of legislation is ECE Regulation 107 which was adopted by UN-ECE (the UN Economic Commission for Europe).

The purpose of Bus 2014 is to drive vehicle development forward and, in a cost-effective way, create even more attractive buses. The goal is that a bus which meets these common sector recommendations shall be accepted and function equally well throughout the whole of Sweden, regardless of the agreement area.

On behalf of the Bus 2014 Project

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1 Security and safety

Passengers shall experience their bus journey as being secure, safe, comfortable and simple. Basic safety requirements are regulated in current legislation through directives and regulations, as well as in instructions issued by the Swedish Transport Agency. The fact that the journey is safe and secure is important for all passenger groups. The sector has therefore reached joint agreement on the following recommendations which, in addition to the regulations in current legislation, contribute further towards increasing the safety for bus passengers and drivers

1.1 CAMERA SURVEILLANCE – GENERAL

Buses shall be prepared for the simple installation of camera surveillance covering the entire vehicle. This could, for example, take the form of pre-prepared lead-throughs throughout the entire vehicle.

Common sector recommendation: *All buses of Class I, II and III brought into service from 1 July 2015*

1.2 CAMERA SURVEILLANCE OPTION – SECURITY SURVEILLANCE OF PASSENGER AREA

Buses shall be fitted with cameras for the security surveillance of the passenger space, which means that it is possible to video record events taking place in the passenger area. **Note!** In order to enable this function, the County Administrative Board concerned must grant the transport operator a permit.

Common sector recommendation: *An option for Class I, II and III buses*

1.3 EMERGENCY EQUIPMENT

Buses shall contain basic equipment for safety and assistance in emergency situations. The basic equipment shall consist of a fire extinguisher and a first-aid box¹.

Common sector recommendation: *All buses*

¹ For information on fire extinguishers, reference is made to [TSFS2010:2](#)

1.4 ALCOLOCKS – IN THE FORM OF AN ALCOLOCK OR AN ALCOBOX

Buses shall be fitted with alcolocks. Alternatively, use shall be made of a system of alcoboxes.

Common sector recommendation: *All buses*

1.5 INTERIOR SURVEILLANCE

It shall be possible to monitor the interior of the bus from the driver's seat.

Common sector recommendation: *All buses brought into service for the first time on 1 January 2010 or later*

1.6 AUTOMATIC FIRE EXTINGUISHING SYSTEM IN ENGINE COMPARTMENT

Buses with combustion engines shall be equipped with an automatic fire extinguishing system in the engine compartment that meets the requirements of Swedish Fire Protection Standards: SBF-128 Permanent automatic fire extinguishing systems on buses. This requirement applies also to supplementary heater units mounted outside the engine compartment.

Common sector recommendation: *All buses*

2 Seating

2.1 SEAT BELTS

Buses shall be provided with belts so that all passengers, including young children, can sit safely. Young children, in this context, refers to children who are transported in a forward-facing position seated on a personally-owned seat belt cushion.

Common sector recommendation: *Buses of Class B and II*

2.2 AUDIO-VISUAL SEAT BELT REMINDERS

Buses in scheduled service shall be fitted with audio-visual seat belt reminders. The seat belt reminders shall emit recurrent signals, and cannot be compared with those installed in cars, which sense when someone is sitting in a seat and is not wearing a seat belt. They should instead be regarded rather as a basic information function for the bus.

Common sector recommendation:

Buses of Class B, II and III, brought into service for the first time on 1 July 2015 or later

For buses of Class B, II and III, brought into service before 1 July 2015, the requirement refers only to audio seat belt reminders.

2.3 ARM-RESTS

Buses shall be fitted with retractable arm rests for seats in the central aisle

Common sector recommendation: *Buses of Class B II and III brought into service for the first time on 1 January 2010 or later*

2.4 WHEELCHAIR AREA

Buses of Class A, B and II shall fulfil the requirements of Enclosure 8 of ECE Regulation 107.

Common sector recommendation: *Buses of Class A, B, II and III brought into service for the first time on 1 January 2010 or later*

2.5 DESIGN OF WHEELCHAIR AREA, CLASSES A, B AND II

The figure below shows how wheelchair areas are to be designed inside a bus where the bus, according to law, does not need to be fitted with seat belts – which means that travel in a wheelchair takes place backwards to the direction of travel. This applies to buses of Class A, B and II. In those cases where the wheel chair is oriented in the vehicle's direction of travel, see Enclosure 3 for further information

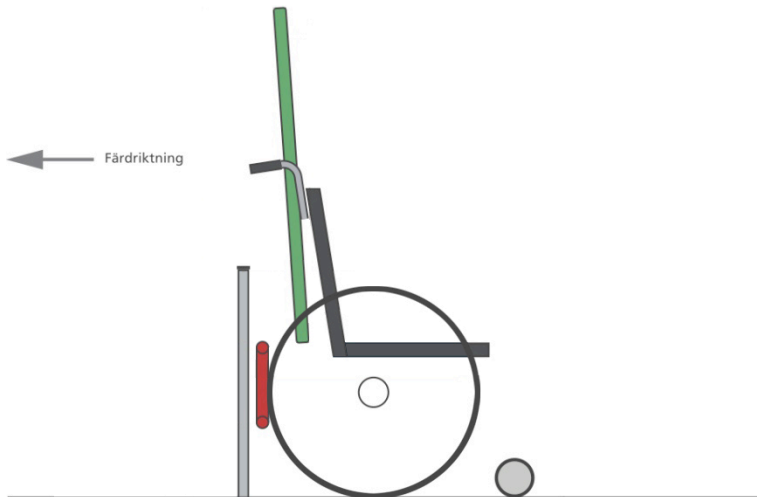


Figure 1. For further information see [ECE-Regulation 107](#), Enclosure 8, Clauses 3.8.4-3.8.6.

Common sector recommendation: Buses of Class A, B, II brought into service for the first time on 1 January 2010 or later

2.6 VISIBILITY THROUGH WINDOWS

There shall be good visibility through windows for all passengers, both short and tall, and regardless of whether they are seated or standing.

Common sector recommendation: All buses

2.7 PROTECTION AGAINST THE SUN

Windows in passenger areas shall be fitted with sun shades. The protection may be in the form of curtains, blinds or toned window panes.

Common sector recommendation: Buses of Class B, II and III

2.8 SEAT POSITIONS

If raised pedesters are used, their height shall be more than 120 mm in relation to the central aisle

No more than 50 % of the seats in low-floor buses with a low entrance layout may be positioned on raised pedesters that exceed the height of the central aisle by more than 250 mm.

No more than 70 % of the seats in other may be positioned on raised pedesters that exceed the height of the central aisle by more than 250 mm.

Common sector recommendation: All buses brought into service for the first time on 1 July 2012 or later.

2.9 SEAT HEIGHTS

The height of seats above floor level shall be between 450 and 500 mm. For further information, see Enclosure 3.

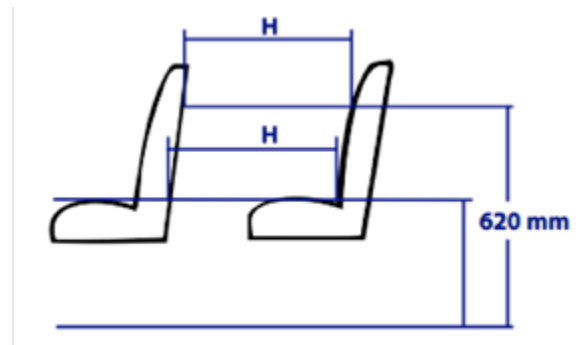
Common sector recommendation: All buses brought into service for the first time on 1 July 2012 or later

2.10 SEAT DIMENSIONS

Minimum space between seats (H):

Buses of Class I, A and B	680 mm.
Buses of Class II	710 mm.
Buses of Class III	750 mm.

The space between seats (H) facing in the same direction is measured horizontally from the forward section of the seat back to the rear section of the seat back in front at all heights above the floor between the upper surface of the seat cushion and a point 620 mm above the floor. An exception is made for space that is impossible to adapt in terms of dimensions. In this case, ECE Regulation 107 shall apply.



Common sector recommendation: All buses brought into service for the first time on 1 January 2010 or later

2.11 RESERVED SEATS AND SPACE FOR PASSENGERS WITH IMPAIRED MOBILITY

2.11.1 DISTANCE BETWEEN RESERVED SEATS

- The distance (H) shall be at least 780 mm.
- In vehicles with low floor levels, the reserved seats shall be positioned in the low floor level area (area without a raised dais). For further information, see Enclosure 3.
- There shall be four reserved seats in Classes I, II and III.

Common sector recommendation: *All buses (apart from articulated buses of Class I and II) brought into service for the first time on 1 July 2012 or later*

2.11.2 DISTANCE BETWEEN RESERVED SEATS FACING EACH OTHER

- The distance (H) shall be at least 1500 mm.
- In vehicles with low floor levels, the reserved seats shall be positioned in the low floor level area (area without a raised dais). For further information, see Enclosure 3.
- There shall be four reserved seats in Classes I, II and III.

Common sector recommendation: *All buses (apart from articulated buses of Class I and II) brought into service for the first time on 1 July 2012 or later*

2.12 SEAT BACKS

2.12.1 HIGH SEAT BACKS

In Bus Classes B, II and III, the seats shall be fitted with high seat back supports, i.e. where the neck support is an integrated part of the back support.

Common sector recommendation: *Buses of Class B, II and III*

2.12.2 INCLINABLE HIGH SEAT BACKS

In Bus Class III, seats in the normal floor area shall be fitted with high seat backs that are inclineable/adjustable.

Common sector recommendation: Buses of Class III brought into service for the first time on 1 July 2015 or later

3 Embarking and disembarking, and moving around inside the bus

3.1 DOOR OPENING/CLOSING

Doors shall be opened by activation on the part of the driver after a passenger, for example, has pressed a stop button. Doors are then opened when a sensor detects that a passenger is approaching a door. Sensors shall also be able to sense passengers with zimmer frames, prams or wheelchairs. The door closing function is operated manually by the driver.

Common sector recommendation: *All buses brought into service for the first time on 1 July 2015 or later*

3.2 DOOR OPENINGS

3.2.1 TICKET INSPECTION OPTION WHEN EMBARKING

Ticket inspection, or some other contact with the driver, shall be possible in a simple way in connection with embarkation.²

Common sector recommendation: *All buses option*

3.2.2 TWO DOOR OPENINGS

Buses shall have at least two door openings.³

Common sector recommendation: *Buses Class I, II and III*

3.2.3 ARTICULATED BUS WITH THREE DOOR OPENINGS

Articulated buses shall have at least three door openings.

Common sector recommendation: *Buses Class I, II and III*

² This is at present the most common solution, but by making it an option we pave the way for BRT solutions where tickets are not inspected beside the driver but a departure has to be made from Bus 2014.

³ According to R-107, Enclosure 3 7.6.1.6, a double embarkation and disembarkation door is counted as two door openings.

3.3 CONTRAST MARKING ON ENTRANCE AND EXIT STEPS

All steps at entrances and exits, as well as inside the bus, shall be clearly contrast-marked. Steps shall be contrast-coloured with at least 0.4 NCS in relation to the remaining interior surfaces inside the bus.⁴ [See also Enclosure 3.](#)

Common sector recommendation: *All buses*

3.4 FLOOR DESIGN

3.4.1 FLOOR STRUCTURE FOR CHOICE OF ENTRY DOORS FOR WHEELCHAIR PASSENGERS

In buses of Class I and II in a low-floor level design, the floor structure shall make it possible for wheelchair passengers with wheelchair dimensions in accordance with R 107, to board the vehicle both through the front door and the middle door of the bus and, from there, to be able to find their own way to the specified wheelchair area and then be able to disembark from the bus via the middle door. The seat layout in the low-floor part of the bus shall thus be flexible to the extent that it shall be possible to choose between embarking via the front or alternatively the middle door.

Note! The requirement for individuals in wheelchairs or with prams to be able to board the bus via the front door does not apply in the case of double-decker buses. For double-decker buses, the bottom floor is to be regarded as a low-floor area and the upper floor as a normal floor section.

Common sector recommendation: *Buses of Class I and II, brought into service for the first time on 1 January 2010 or later.*

⁴ For further information regarding NCS, see www.ncscolour.com or consult the book entitled *Bygg ikapp handikapp* published by Svensk Byggtjänst.

3.4.2 ENTRANCE FOR WHEELCHAIR PASSENGERS NEAR THE DRIVER'S SEAT OR SOME OTHER DOOR OPENING

Wheelchair passengers shall board the bus via the front door. This solution gives a smaller number of seats in the low-floor level part of the vehicle than the alternative below. Note that this does not apply to double-decker buses.

Wheelchair passengers shall board the bus via the middle door. This solution gives a larger number of seats in the low-floor level part of the vehicle.

Requirement in current transport procurement:

All passengers board the bus near the driver's seat

All passengers in wheelchairs or with prams board the bus via some other door opening

3.4.3 PODESTER HEIGHT

If podesters are used, the podester height must exceed 120 mm in relation to the central aisle.

Common sector recommendation: All buses brought into service for the first time on 1 July 2012 or later

3.4.4 FOOTSTEP HEIGHT

The highest and lowest height for a footstep inside the vehicle shall be 120-200 mm.

Common sector recommendation: Buses Class I and II, brought into service for the first time on 1 January 2010 or later

3.5 HANDRAILS AND HANDLES

Handrails and handles shall be contrast-coloured with at least 0.4 NCS in relation to the remainder of the bus interior.⁵

Common sector recommendation: All buses brought into service for the first time on 1 January 2010 or later

⁵ For further information relating to NCS, reference is made to www.ncscolour.com or to the book entitled *Bygg ikapp handikapp* published by Svensk Byggtjänst.

4 Other comfort aspects

4.1 PRAMS AND PUSH-CHAIRS

4.1.1 AREAS FOR PRAMS/PUSH-CHAIRS

There shall be room available inside the bus for prams and pushchairs. The width of a pram is considered to be 600 mm. Anti-tip devices (or pram straps) shall be fitted for prams/push-chairs. Note that the pram area is allowed to be part of the wheelchair area.

Common sector recommendation: All buses of Class A, I and II low-floor

4.1.2 NUMBER OF PRAM/PUSH-CHAIR PLACES (LOW FLOOR)


- Buses of Class A shall have at least one pram/push-chair place on the low-level floor.
- Buses of Class I and II low floor shall have at least three places for prams/push-chairs, two of which in the low-floor section. Buses of Class I shorter than 11.5 m shall have at least two pram/push-chair places on the low-level floor.

Common sector recommendation: All buses of Class A, I and II low-floor

4.1.3 OPTION FOR NUMBER OF PRAM/PUSH-CHAIR PLACES

Concerning requirements for pram/push-chair places other than those in Section 4.1.2 of this procurement:

Buses shall have _____ pram/pushchair places.



For the client:
Specify the number of
pram/push-chair places
here.

4.2 LIGHTING

Buses shall be fitted with individual reading lamps. This applies only to those parts of the bus with a normal floor level.

Common sector recommendation: Buses of Class B, II and III brought into service for the first time on 1 July 2015 or later

4.3 VENTILATION

Buses shall be fitted with automatic climate control. If the outdoor temperature is over +25°C, the temperature in the bus shall be decreased by at least 3°C in relation to the outdoor temperature.

Common sector recommendation: *All buses brought into service for the first time on 1 July 2015 or later*

4.4 ELECTRICAL SOCKETS

Seats in buses shall be fitted with an electrical power socket of, for example, the USB-type for the charging of mobile phones, etc.

Common sector recommendation: *Buses of Class B, II and III, brought into service for the first time on 1 July 2015 or later*

4.5 TOILET OPTION

Buses shall be equipped with a toilet and the possibility to install a wash-basin.

Common sector recommendation: *An option for buses of Class II and III*

4.6 LUGGAGE RACKS – LOW-FLOOR

Buses of a low-floor design shall be fitted with luggage racks, for example over the front-wheel housing.

Common sector recommendation: *Buses of Class II and III*

5 Information and communication

5.1 EXTERIOR INFORMATION

5.1.1 ROUTE AND DESTINATION SIGNS - GENERAL

- All signs shall be programmable. If there is no on-board vehicle computer, this shall be possible from the driver's cab/seat in order to guarantee flexibility in connection with route changes.
- All signs shall be clearly legible for the passengers. See Enclosure 3 regarding good legibility.

Common sector recommendation: *All buses brought into service for the first time on 1 January 2010 or later*

5.1.2 ROUTE AND DESTINATION SIGNS - FRONT

There shall be route and destination signs on the front of buses.

Common sector recommendation: *All buses.*

5.1.3 ROUTE AND DESTINATION SIGNS – FRONT DOOR AND REAR

- On Buses of Class I, II and III operating in regular traffic, there shall be route number and destination signs on the front door.
- On buses of Class I, II and III in regular traffic there shall be a route sign on the rear end of the bus.

Common sector recommendation: *Buses of Class I, II and III, brought into service for the first time on 1 January 2010 or later*

5.1.4 EXTERIOR LOUDSPEAKERS

Buses shall be fitted with exterior loudspeakers positioned beside the entrance door that permit announcements to be made of the route number, destination and other messages. The loudspeaker system shall be clearly audible for passengers. See Enclosure 3 regarding good audibility.

Common sector recommendation: *All buses brought into service for the first time on 1 January 2010 or later*

5.2 INTERIOR INFORMATION

Information shall be adapted to suit the requirements of different passengers.

5.2.1 AUTOMATIC PASSENGER INFORMATION

Buses shall be equipped with systems for automatic passenger information, for example bus-stop announcements. The system shall provide good audibility and legibility for passengers, irrespective of where they are sitting or standing in the vehicle. All information shall be audiovisual.

The contrast between text and background shall be at least 0.6 NCS.

See Enclosure 3 regarding good audibility and legibility .

Common sector recommendation: All buses brought into service for the first time on 1 January 2010 or later

5.2.2 OTHER PASSENGER INFORMATION

In the event of unexpected events or occurrences, it shall be possible to provide passengers with information via the driver's microphone.

Common sector recommendation: All buses

5.2.3 SIGNAL BUTTONS

- Signal/Stop buttons shall be red with white text in relief.
- When a signal/stop button is pressed, both audio and visual signals shall be generated.
- Signal buttons shall be placed close to each reserved seat and in each wheelchair area, and shall in these places be located at a height of 700 – 1000 mm above floor level.

Common sector recommendation: All buses brought into service for the first time on 1 July 2012 or later

5.2.4 SIGNAL BUTTON TO ATTRACT DRIVER'S ATTENTION

- Signal buttons to attract the driver's attention, for example to extend the period in which the doors remain open when passengers are disembarking from the bus, shall be blue in colour with the intended function illustrated in relief.
- When a signal/stop button is pressed, both audio and visual signals shall be generated.
- Signal buttons shall be placed close to each reserved seat and in each wheelchair area, and shall in these places be located at a height of 700 – 1000 mm above floor level

Common sector recommendation: *All buses brought into service for the first time on 1 July 2012 or later*

5.2.5 SIGNAL BUTTON OUTSIDE THE VEHICLE

- Signal buttons that are located outside the vehicle to attract the driver's attention shall be clearly visible with a pram/push-chair symbol on the actual button. When the button is pressed, acknowledgement shall be received by the activation of diodes positioned around the button.

Common sector recommendation: *Buses of Class I, II and III, brought into service for the first time on 1 July 2012 or later*

5.2.6 WIRELESS INTERNET ACCESS (WIFI)

Buses shall be fitted with wireless internet access (wifi), the capacity of which shall be at least sufficient to gain access to mobile data traffic, via for example 3G and 4G with a minimum speed of 6 Mbit downstream and a free data volume.

Common sector recommendation:

Buses Class B, II and III, brought into service for the first time on 1 July 2015 or later

6 Exterior/outside

6.1 PREPARATION FOR CYCLE HOLDERS

Buses with no luggage space to transport cycles shall be fitted in such a way that it is possible to install cycle holders.

Common sector recommendation: *Buses Class I and II, brought into service for the first time on 1 July 2012 or later*

6.2 CYCLE HOLDER OPTION

Buses shall be fitted with cycle holders.

Common sector recommendation: *An option for buses of Class I and II*

6.3 FLAG HOLDER

Each front corner of the bus shall be fitted with a flag holder.

Common sector recommendation: *Buses Class I*

7 Driver's environment

In general, ISO Standard, SS-ISO 16121-3,4, ECE Regulation 107, Clause 7.6.4.6. shall apply. However, the ISO-standard gives no consideration to certain aspects of the driver's environment in low-floor level buses.

7.1 ERGONOMICS

When driving straight ahead at speeds of up to 10 km/h on a normal carriageway (IRI Value 2.0), the power needed to turn the wheel to its full extent may not exceed 10 daN (100 N). When driving at 30 km/h on a carriageway with an IRI Value of 3.0 (with short wavelengths), the highest level of vibration in any direction measured on the driver's seat cushion may not exceed 0.5 m/s².⁶

These measurements shall be taken in accordance with SS-ISO 2631-1:1997, SS-EN 1032:2003 and SS-EN 12096:1998. The specified value is for the equivalent value over a period of five minutes. The measurements shall be taken with a driver who weighs 80 kg +/-5kg. At the time of measurement, the tyre pressure of the vehicle shall be that specified by the manufacturer, and the seat settings shall be in line with the manufacturer's instructions

Common sector recommendation: *All buses brought into service for the first time on 1 January 2010 or later*

7.2 CLIMATE

Wintertime: The temperature in the driver's compartment may not fall below +15°C during continuous driving (after 30 minutes' driving) at a measuring point in the driver's compartment as specified in ISO 6549.

Summertime: At an outdoor temperature that exceeds +25°C, it shall be possible for the temperature in the driver's compartment to be lowered by at least 3°C in relation to the outdoor temperature

Common sector recommendation: *All buses brought into service for the first time on 1 January 2010 or later*

7.3 DRIVER'S SAFETY AND SECURITY

7.3.1 CAMERA MONITORING OF EMBARKING PASSENGERS

Space shall be available in the driver's compartment to fit the bus with a camera(s) that can be directed at the entrance door(s) to take pictures of embarking passengers and/or can monitor both the driver's compartment and the area surrounding the driver's barrier gate so that embarking passengers can also be monitored.

Common sector recommendation:

All buses of Class I and II brought into service for the first time on 1 January 2010 or later

All buses of Class A, B and III brought into service for the first time on 1 July 2015 or later

7.3.2 HANDS-FREE MOBILE TELEPHONY

If mobile telephony has been fitted in the driver's compartment, it shall be of the hands-free type, except in connection with activation/connection and de-activation.

Common sector recommendation: *All buses brought into service for the first time on 1 January 2010 or later*

7.3.3 VISION-ENHANCEMENT DEVICES

There shall be vision enhancement devices, for example mirrors or cameras, which make it possible for the driver, from the driver's compartment, to monitor the area immediately next to all exit doors, irrespective of whether the doors are open or closed. Monitoring shall be at least activated when the bus is standing still at a bus-stop and when it leaves the bus-stop. (One and the same vision enhancement device can monitor one or more doors.)

In the case of articulated buses, the vision enhancement device shall provide the driver with a good overview even when the bus is positioned in such a way that the front section and back section door sides form an angle other than 0 degrees

Reference is made to SS-ISO 16121- 3, 4.

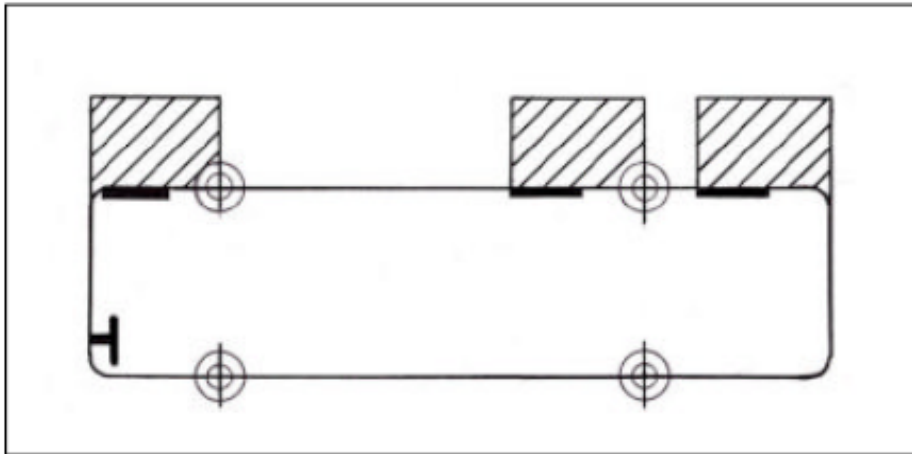


Figure 5. It shall be possible to monitor the hatched areas outside the bus.

Common sector recommendation: All buses brought into service for the first time on 1 January 2010 or later

7.3.4 WARNING SYSTEMS FOR SERIOUS FAULTS

Warning systems that indicate serious faults shall only be possible to reset manually. Serious faults in this context refers to faults that are normally indicated with a red warning light that could adversely affect the bus stability and braking, communication and control systems in such a way that there is a risk of personal injury.

Common sector recommendation: All buses brought into service for the first time on 1 January 2010 or later

7.3.5 SEAT BELTS

Buses of Class I shall be fitted with a three-point seat-belt on the driver's seat. It shall be possible for the upper fixing point for the belt to be vertically adjusted.

Common sector recommendation: All buses brought into service for the first time on 1 January 2010 or later

7.3.6 DOOR BRAKES

Door brakes shall have three independent warning systems that warn the driver if he/she exits the bus without having applied the parking brake.

1. The system shall warn the driver with a buzzer signal when the engine is switched off if the parking brake has not been applied.

2. An additional buzzer shall warn the driver if he/she has left the driver's seat without applying the parking brake.
3. If the driver leaves the bus without having applied the parking brake, and from outside the bus performs an action that normally activates the door brakes, for example breaks the main current or closes the front door, the door brakes shall not be activated, the doors shall remain open, the signal horn shall be sounded and all the bus direction indicators shall be activated.

Common sector recommendation: Buses Class I, II and III brought into service for the first time on 1 January 2010 or later

7.3.7 DRIVER SECURITY

Buses shall be fitted with an assault alarm in the driver's compartment. The device(s) shall, as far as possible, be fitted so that they are easily accessible for the driver, but are concealed or not visible to a person who is standing immediately outside the the driver's compartment. It is important that the driver shall not be able to activate the alarm unintentionally.

Common sector recommendation: All buses brought into service for the first time on 1 January 2010 or later

ENCLOSURE 1. Bus class definitions

The classification of bus types is used in various contexts to briefly describe vehicles. In Regulation R-107, the following vehicle classes are defined: A, B, I, II and III. Reference is made to R-107, Chapter 2.

MAX. 22 PASSENGERS

Vehicles that are fitted out for the conveyance of max. 22 passengers in addition to the driver.

CLASS A

Vehicles designed for the conveyance before and/or of standing passengers. A vehicle coming under this class is fitted with seats and shall have space for standing passengers.

CLASS B

Vehicles that are not designed for the conveyance of standing passengers. A vehicle of this class lacks space for standing passengers.

OVER 22 PASSENGERS

Vehicles that are fitted out for the conveyance of over 22 passengers apart from the driver:

CLASS I

Vehicles that are manufactured with sufficient space for standing passengers in order to permit frequent passenger movements.

CLASS II

Vehicles that are primarily manufactured for the conveyance of seated passengers and which are designed to permit the conveyance of standing passengers in the central aisle and/or in an area that is no larger than the space required for two double seats.

CLASS III

Vehicles that are exclusively manufactured for the conveyance of seated passengers.

LOW-FLOOR LEVEL BUSES

A vehicle of Class I, II or A in which approximately 35 % of the space allocated for standing passengers (or the forward section when it comes to articulated vehicles or the lower floor when it comes to double-decker vehicles) consists of an area without steps and makes it possible to reach at least one embarkation and disembarkation door.

ENCLOSURE 2. Links

Courts of Sweden portal for Swedish legal information

www.lagrummet.se

Swedish Transport Administration

www.trafikverket.se

Swedish Transport Board

www.transportstyrelsen.se

Framework Directive

[2007/46/EG](#)

ECE Regulation on Vehicles

[ECE-reglemente 107](#)

Swedish Fire Protection Association standards for automatic fire extinguishing systems in engine compartments.

www.brandskyddsforeningen.se

Fact sheet on travelling by wheelchair on board a bus

www.svenskkollektivtrafik.se

Skandinaviska Färginstitutet AB - NCS - Natural Colour System

<http://www.ncscolour.com>

ENCLOSURE 3. Detailed description of certain functional requirements

GUIDELINES FOR AVAILABILITY

This enclosure is a descriptive document that is primarily aimed at vehicle manufacturers. Here, a more detailed description is given of various functional requirements.

Vehicles of Class I shall be available for people with impaired mobility, including wheelchair users, in accordance with the technical provisions of Enclosure 8 in R-107

Vehicles of Class II, III and Classes A and B shall also be available for persons with impaired mobility, including wheelchair users, in accordance with the technical provisions of Enclosure 8 in R-107 (Bus 2014).

ENTRANCE STEP

In order to provide good accessibility for passengers in wheelchairs, with zimmer frames, prams, pushchairs, etc., efforts shall be made to achieve the minimum horizontal vertical clearances between the bus-stop and the vehicle floor.

Ramps should be available on all buses of a low-floor design. The ramps shall bridge the gap between the floor in the passenger section and the ground or pavement.

Contrast marking at doors shall be at least 100 mm wide. Other contrast markings shall be at least 20 mm wide. Contrast in this context means a difference in the level of brightness of at least 0.4 according to NCS (Bus 2014). The contrast shall be retained throughout the entire lifetime of the bus. It could be difficult to achieve sufficient contrast with metal strips.

All steps at entrances and exits as well as inside the bus shall be clearly contrast-marked. Steps shall be contrast coloured with at least 0.4 NCS in relation to the remaining interior surfaces of the bus (Bus 2014).

The height of the first step from the ground in at least one entrance or exit doorway may not exceed 250 mm for vehicles of Class I and A, and 320 mm for vehicles of Class II, III and B (Bus Directive, Enclosure VII, § 3.1).

As an alternative for vehicles of Classes I and A, the first step may not be higher than 270 mm from the ground in two door openings and one exit door. A kneeling system and/or footstep may be attached (Bus Directive, Enclosure VII Section 3.1).

Regulations concerning the height of steps are to be found in the Bus Directive, Enclosure VII, Section 3.1 "Foot steps".

LOW FLOOR DESIGN AND KNEELING

All buses of Class I and II shall be of the low floor-level design.

Buses should be fitted with a system by which a vehicle chassis is either fully or partly lowered or raised in relation to its normal level when moving. The bus driver shall, when necessary, adjust the level of the bus vertically with the aim of minimising the difference in height at each bus-stop.

In buses of Class I and II in a low floor-level design, the bus floor structure shall make it possible for wheelchair passengers with a wheelchair, the dimensions of which comply with the Bus Directive, to embark through both the front and middle doors of the bus and from there be able to make their own way to the appointed wheelchair place and thereafter disembark from the bus via the middle door (Bus 2014).

The seating arrangement in the low-floor area shall be flexible to the extent that it shall be easy to rearrange the seating layout.

Regulations on kneeling systems and ramps are regulated in R-107, Section 5.10

PASSENGER SPACE

From the passengers' point of view, it is important that the bus fittings are designed to facilitate moving around inside the bus. There should always be enough grip supports in the bus to minimise the risk of falling over while the bus is in motion. The bus fittings should have a high level of contrast to make it easier for passengers with impaired sight to move around. The most important factor is that seats should contrast with both floors and walls. Grip supports shall contrast with floors, walls and seats.

The material for seat coverings and other fittings shall not be of a type that emits substances that are dangerous to health or could cause allergies. The coverings and surface claddings selected shall be easy to clean and collect particles, animal hair, etc. to the least extent possible.

Handrails and handles shall be contrast-coloured with at least 0.4 NCS in relation to the rest of the bus interior (Buss 2014).

The material used in seat covers and other fittings shall be chosen so that problems in connection with allergies are minimised (Bus 2014)

FLOORS

Floor coverings in buses should be anti-skid treated and not cause dazzle. Floor coverings shall provide a good contrast with contrast markings and other interior features.

Regulations governing floor gradient are to be found in R-107, Section 7.7.6

DIFFERENCES IN LEVEL (FOOT STEPS AND PODESTERS)

Differences in level are frequently a problem for the functionally impaired and shall therefore not occur in the vehicle in such a way that the possibility for the person in question to use the vehicle decreases to any significant extent. It is often difficult for passengers with some form of impaired mobility to take large steps up or down. It is thus important that both podesters and steps are not too high.

The transition from a lower-level central aisle to a seating area is referred to in this context as a podester. Podesters shall not be regarded as foot steps.

If podesters are used, their height must be more than 120 mm in relation to the central aisle in order to minimise the risk of stumbling (Bus 2014).

Max. 50% of the seats in a bus may be located on podesters that exceed 250 mm in height in relation to the central aisle (Bus 2014).

According to R-107, the rise on foot steps (with the exception of the first step from the ground), may not exceed 200 mm for vehicles of Classes I and A, and 225 mm for vehicles of Classes II, III and B.

Provisions governing the rise on steps are regulated in R-107, Enclosure 4.

POLE SUPPORTS

Pole supports are important for all passengers who are not seated or who choose to stand during a bus journey. Holding on to something reduces the risk of passengers falling over. In the case of passengers with an impaired sense of balance, this is even more important. Many elderly and functionally impaired people require a little more time to leave the vehicle and thus need to prepare themselves in good time. Pole supports should therefore be positioned immediately adjacent to doors in order to facilitate embarking and disembarking. Poles should preferably extend from floor to ceiling so that they can be reached by all passengers, regardless of how tall they are. Poles beside seats shall be designed so that it is easy to sit down and get up.

It is important for hand rails and push-buttons to have a clear contrast with their surroundings since the background through the windows is continually changing.

Hand rails and handles shall be contrast-coloured to at least 0.4 NCS in relation to the remaining interior bus surfaces (Bus 2014).

Hand rails and handles shall be installed near reserved seats so that passengers can easily hold on to them (R-107, Enclosure 8).

Provisions concerning hand rails and arm rests are regulated in R-107, Enclosure 8.

SIGNAL BUTTONS

Signal buttons shall be evenly distributed throughout the entire vehicle, shall be easily accessible by seated passengers and be easy to press.

Holders/housings should contrast with both hand-rails/poles and their surrounding by at least 0.4 NCS, and the covering plate on the back of the hand-rail/pole shall also contrast with the pole/rail.

Touch-buttons can supplement “normal” signal buttons at seats reserved for passengers with impaired mobility, but should this be the case, a “normal” signal button which is not a touch-button must also be provided in the same place.

Signal buttons should have a raised pressure surface in relation to the housing and be printed in relief, so that S, STOP or Pram can be felt.

Signal buttons shall be positioned at most 1 200 mm above floor level regardless of bus class. It shall be possible for passengers to reach a signal button without having to move from their seats or wheelchair places, etc.

Signal buttons/stop buttons shall be red with a white text in relief. On pressing a signal button/stop button, both audio and visual signals shall be activated. Signal buttons shall be located near each reserved seat and in each wheelchair space, and shall be positioned at a height of 700-1000 mm above floor level (Bus 2014).

Provisions concerning the design of communication devices are regulated in R-107, Section 7.6

RESERVED SEATS FOR PASSENGERS WITH IMPAIRED MOBILITY OR SOME OTHER FUNCTIONAL IMPAIRMENT

In all bus classes, except Class B, at least four seats must be marked as being seats for people with a functional impairment (Bus 2014).

A relatively high seat height makes it easier for people to sit down and stand up. The height of the seats above floor level shall be 450-500 mm, with the ambition being to be as close to 500 mm as possible.

There should be grip supports in the form of horizontally-oriented handles or rails near the reserved seats which passengers can hold on to when they get up or sit down. The reserved seats shall have foldable arm rests adjacent to the central aisle.

Many elderly and functionally impaired people take a longer time to disembark from the bus. By locating reserved seats near the doors it is easier for them to find and reach a seat

It shall be possible to recognise the special reserved seats both when someone is sitting on them and when they are vacant. The reserved seats should be marked with a decal that is at least 126 x 126 mm in size and which is clearly visible.

The distance between seats that are reserved for people with impaired mobility or some other functional disability shall be greater in order to make it easier for passengers to sit

down and get up from the seat. The reserved seats must be positioned in the low floor area so that the seats can be used by passengers with impaired mobility and passengers who have difficulty in taking a step upwards.

There should be sufficient room beneath seats for passengers to insert their legs when getting up from their seat.

The minimum distance between seats that are located behind each other shall be 780 mm in Class I, Class II low-floor design, Class II normal floor design, Class III and Classes A and B (Bus 2014).

The distance between seats that are positioned opposite each other shall be at least 1500 mm in Class I, Class II low-floor design, Class II normal floor design, Class III and Classes A and B (Bus 2014).

The reserved seats shall be positioned in the low-floor area (area without daises) in Class I, Class II low-floor design, Class II normal floor design, Class III and Classes A and B (Bus 2014).

Provisions concerning the design of reserved seats for functionally impaired passengers are regulated in R-107, Enclosure 8.

WHEELCHAIR PLACES

Buses of Class A, B and II shall meet the requirements of Enclosure 8 in R-107.

The wheelchair area shall be designed so that wheelchair users can be transported without securing the wheelchair, facing backwards against a support or a seat-back in accordance with the regulations of R-107, Enclosure 4.

On those buses that require the wheelchair to be secured in place, the design shall be such that the securing can be done quickly and easily.

Fold-back chairs may not be installed in the wheelchair area which prevent the area from being used in the way intended.

Only in those cases where all the seats are fitted with seat belts shall the wheelchair places be fitted with belts.

“ORDINARY” SEATS

A relatively high seat height makes it easier to sit down and stand up. There should be sufficient room beneath seats for passengers to insert their legs when getting up from their seat.

The height of the seats above floor level shall be between 450 and 500 mm (Bus 2014).

Max. 50% of the seats in buses may be positioned on pedesters that are higher than 250 mm in relation to the central aisle (Bus 2014).

INFORMATION

In order for passengers with functional impairments to be able to receive the information that is communicated inside and outside the bus in a satisfactory way, it is important for the information to be adapted to suit the specific needs of different groups. The journey will be more difficult to make and will be experienced as being less secure if the passenger cannot receive the information communicated.

The information shall be adapted to suit the requirements of different passenger groups. All information shall be audio-visual (Bus 2014).

The illuminated sign(s) on buses shall provide good legibility for passengers irrespective of where they are seated in the vehicle (Bus 2014).

It shall also be possible for the illuminate sign(s) inside the bus that say "Stop", or other illuminated signs, to automatically display the name of the next bus-stop, connections, information on disruptions, etc. along the entire route. The design of the signs shall permit good legibility for passengers irrespective of where they are sitting or standing in the vehicle (Bus 2014).

The contrast between text and background shall be at least 0.7 NCS (Bus 2014).

Buses shall be fitted with an audio communication system for manual bus-stop announcements. The communication system shall provide good audibility for passengers irrespective of where they are sitting or standing in the vehicle (Bus 2014).

GOOD AUDIBILITY

Good audibility is what is easily understood by most people. The sound shall not be too loud or too sharp, but preferably clear and distinct.

The interior loudspeaker system shall permit good audibility for all passengers.

The exterior loudspeaker system shall permit a level of speech understanding that conforms to $STI > 0.6$ (Speech Transmission Index) and can be obtained over an area near the front door of the bus corresponding to 3 x 2 m at normal ear height for a standing person (approx. 1.5 m). The amplification of loudspeakers for the exterior announcements shall be independent of other loudspeaker systems inside the bus.

With consideration to the prevailing noise target values, the position and direction shall be designed so that minimal disturbance is caused to the surroundings. This can, for example, be obtained with the following solution: The loudspeaker is positioned above the front door opening directed downwards towards the area outside the front door of the bus, with an approximately 30 degree inclination. The loudspeaker shall be placed beneath a screen

GOOD LEGIBILITY

If a display with rolling text (either horizontal or vertical) is used, the horizontal rolling speed shall not exceed 6 characters per second.

The contrast between text and background shall be at least 0.6 NCS. Text that will primarily be read at a distance of 2 m should be 70-100 mm.

The text for all information shall be large enough for passengers with normal vision to be able to see and read the information from most places inside the vehicle.

In general, use should be made of:

- A clear font.
- First letters in capitals and other letters in sub-case.
- A clear contrast between wall and sign base.