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## CHAPTER 1 VEHICLE REQUIREMENTS

### Title 1. General

### § 1. Determination of dimensions

**Article 1**

1. For determining the dimensions of vehicles or combinations of vehicles, the following terms will have the respective meanings specified below:
   a. axle: the horizontal line that is perpendicular to the median longitudinal plane of the vehicle and goes through the middle of one or more wheels when these are in a forward driving position;
   b. length of a vehicle or combination of vehicles: horizontal distance between two vertical planes perpendicular to the median longitudinal plane of the vehicle or combination of vehicles and passing through the extreme front and rear of the vehicle or combination of vehicles, measured in the forward driving position on a horizontal road surface; not taking into account the mirrors and their attachments; a sun visor which extends no further than 0.20 m in front of the front vertical plane, as established for an unmounted sun visor, and that can be removed with simple tools, is not taken into account;
   c. width of a vehicle: horizontal distance between two vertical surfaces that are the same width as the median longitudinal plane of the vehicle and passing through to the extreme left and right-hand side of the vehicle, measured in forward driving position on a horizontal road surface; not taking into account the mirrors and their attachments;
   d. height of a vehicle: the vertical distance between the road surface and a horizontal plane passing through the highest part of the vehicle, measured on a horizontal road surface in the driving position.
2. Subject to the additional restrictions set out in Tables I, II and III below, the devices and equipment specified in these tables do not need to be taken into account when determining the outer dimensions provided that the following requirements are met:

a. if multiple devices are mounted at the front, these may not protrude more than 25 cm in total;
b. devices and equipment added to the length of the vehicle may not protrude more than 75 cm in total;
c. devices and equipment added to the width of the vehicle other than rear-view mirrors, may not protrude more than 10 cm in total.

3. The requirements in the second paragraph, subsections a and b do not apply to devices intended to improve indirect vision.
4. The second paragraph applies mutatis mutandis to the determination of the dimensions referred to in Articles 5.12.6, third, fourth and fifth paragraphs, and 5.14.6, fifth paragraph.

**Table I Vehicle length**

| | | Passenger cars | Buses | Commercial vehicles with a technically permissible maximum mass not exceeding 3,500 kg | Commercial vehicles with a technically permissible maximum mass exceeding 3,500 kg | Trailers with a technically permissible maximum mass not exceeding 750 kg | Agricultural- and foresty tractor |
|---|---|---|---|---|---|---|---|
| 1. | Devices intended to improve indirect vision and to observe the road section behind the vehicle | X | X | X | X | X | X |

| | Continuation of Table I Vehicle length | Passenger cars | Buses | Commercial vehicles with a technically permissible maximum mass not exceeding 3,500 kg | Commercial vehicles with a technically permissible maximum mass exceeding 3,500 kg | Trailers with a technically permissible maximum mass not exceeding 750 kg | Agricultural- and foresty tractor |
|---|---|---|---|---|---|---|---|
| 2. | Washer and wiper installation | X | X | X | X | | |
| 3. | Exterior sun visors | | | | X | | |
| 4. | Front under run protection system | X | | X | | | |
| 5. | Footrests and handles | | X | X | X | X | X |
| 6. | Coupling | X | X | X | X | | |
| 7. | Additional coupling | | | | | X | X |
| 8. | Bicycle rack (removable/foldin g) | X | | X | | | |
| 9. | Lifting platforms, ramps and similar equipment, provided that the load capacity is not increased and the equipment does not protrude more than 0.30 m | X | X | X | X | X | X |
| 10. | Observation and detection equipment, including radars | | X | | X | X | X |
| 11. | Resilient buffers and similar equipment | | | X | X | X | X |
| 12. | Custom sealing devices and their protections | | | X | X | X | X |
| 13. | Devices for securing the tarpaulin and their protection | | | X | X | X | X |
| 14. | Length stops for demountable bodies | | | X | X | X | X |

| | Continuation of Table I Vehicle length | Passenger cars | Buses | Commercial vehicles with a technically permissible maximum mass not exceeding 3,500 kg | Commercial vehicles with a technically permissible maximum mass exceeding 3,500 kg | Trailers with a technically permissible maximum mass not exceeding 750 kg | Agricultural- and foresty tractor |
|---|---|---|---|---|---|---|---|
| 15. | Trolley booms and pantographs of electrically driven vehicles | | Only buses with a technically permissible maximum mass exceeding 5,000 kg | X | X | X | |
| 16. | Front and rear number plates | | X | X | X | X | X |
| 17. | Lighting equipment | X | X | X | X | X | X |
| 18. | Aerodynamic devices and equipment. | | X | | X | Only trailers with a technically permissible maximum mass exceeding 3,500 kg | |
| 19. | Air intake pipes | | | X | X | X | X |
| 20. | Antennas used for vehicle-to-vehicle or vehicle-to-infrastructure communication | | X | X | X | X | X |

**Table II Vehicle width**

| | | Passenger cars | Buses | Commercial vehicles with a technically permissible maximum mass not exceeding 3,500 kg | Commercial vehicles with a technically permissible maximum mass exceeding 3,500 kg | Trailers with a technically permissible maximum mass not exceeding 750 kg | Agricultural- and foresty tractor |
|---|---|---|---|---|---|---|---|
| 1. | Devices for indirect vision | X | X | X | X | X | X |
| 2. | The bulging of the sidewalls of the tyres at the point of contact with the road surface | X | X | X | X | X | X |
| 3. | Flat tyre indicators | | Only buses with a technically permissible maximum mass exceeding 5,000 kg | X | X | X | X |
| 4. | Tyre pressure indicators | | Only buses with a technically permissible maximum mass exceeding 5,000 kg | X | X | X | X |
| 5. | Lighting equipment | X | X | X | X | X | X |
| 6. | Ramps, lifting platforms and similar equipment that do not protrude more than 0.10 m beyond the side of the vehicle, and the corners of the forward or rearward facing ramps must be rounded to a radius of at least 5 mm; the edges must be rounded to a radius of at least 2.5 mm | | X | | X | X | X |

| | Continuation of Table II<br>Vehicle width | Passenger cars | Buses | Commercial vehicles with a technically permissible maximum mass not exceeding 3,500 kg | Commercial vehicles with a technically permissible maximum mass exceeding 3,500 kg | Trailers with a technically permissible maximum mass not exceeding 750 kg | Agricultural- and foresty tractor |
|---|---|---|---|---|---|---|---|
| 7. | Retractable lateral guidance devices intended for use on guided bus system, if these are not retracted. Retractable steps when deployed and the vehicle is stationary | | Only buses with a technically permissible maximum mass exceeding 5,000 kg | | | | |
| 8. | Observation and detection equipment, including radars | | X | | X | X | X |

| | Continuation of Table II<br>Vehicle width | Passenger cars | Buses | Commercial vehicles with a technically permissible maximum mass not exceeding 3,500 kg | Commercial vehicles with a technically permissible maximum mass exceeding 3,500 kg | Trailers with a technically permissible maximum mass not exceeding 750 kg | Agricultural- and foresty tractor |
|---|---|---|---|---|---|---|---|
| 9. | Aerodynamic devices and equipment. The width of the vehicle, including the conditioned body with insulated walls and the measured projections, must not exceed 2 600 mm, both with the devices and equipment in the retracted or folded position and in the position of use | | | X | X | X | Agricultural- and foresty tractor |
| 10. | Custom sealing devices and their protections | | | X | X | X | X |

| | Continuation of Table II<br>Vehicle width | Passenger cars | Buses | Commercial vehicles with a technically permissible maximum mass not exceeding 3,500 kg | Commercial vehicles with a technically permissible maximum mass exceeding 3,500 kg | Trailers with a technically permissible maximum mass not exceeding 750 kg | Agricultural- and foresty tractor |
|---|---|---|---|---|---|---|---|
| 11. | Devices for securing the tarpaulin and their protection | | | X | X | X | X |
| 12. | Protruding flexible parts of a spray-suppression system, flexible mudguards and spray protectors | | X | X | X | X | X |
| 14. | Snow chains | X | X | X | X | X | X |
| 15. | Safety rails on vehicles for vehicle transport Only for vehicles designed and constructed for the transport of at least two other vehicles and for which the safety rails are more than 2.00 m but no more than 3.70 m from the ground and do not protrude more than 5 cm from the outermost side of the vehicle. The width of the vehicle as a result of these safety rails may not exceed 2.65 m. | | | | X | Only trailers with a technically permissible maximum mass exceeding 3,500 kg | |
| 16. | Retractable steps and other extendible and fold-out parts, if they are extended or folded out | | | X | X | X | |

**Table III Vehicle height**

| | | Passenger cars | Buses | Commercial vehicles with a technically permissible maximum mass not exceeding 3,500 kg | Commercial vehicles with a technically permissible maximum mass exceeding 3,500 kg | Trailers with a technically permissible maximum mass not exceeding 750 kg | Agricultural- and foresty tractor |
|---|---|---|---|---|---|---|---|
| 1. | Radio or radio-navigation antenna | X | X | X | X | X | X |
| 2. | Pantographs or trolley booms in their extended position | | Only buses with a technically permissible maximum mass exceeding 5,000 kg | X | X | X | |

## § 2. Conformity of the vehicle with the vehicle registration register

**Article 2**

The following data, if specified in the vehicle registration register, must correspond to the vehicle:

a. vehicle registration certificate;
b. vehicle identification number;
c. fuel or fuels, whereby:
   - 'A' stands for alcohol;
   - 'B' stands for petrol;
   - 'C' stands for LNG;
   - 'D' stands for diesel;
   - 'E' stands for electricity;
   - 'E/B', 'E/D', 'E/G' or any other combination containing an 'E' stands for hybrid;
   - 'G' stands for LPG;
   - 'H' stands for CNG;
   - 'W' stands for hydrogen.

   A combination of fuels is indicated by multiple letters.

   If the fuel code 'C', 'G' or 'H' is not stated in the vehicle registration register, the following components of an LNG, LPG or CNG installation may not be installed:

1°. evaporator, pressure regulator or other fuel metering system. An exhaust pin, which acts as an evaporator in an air-cooled engine does not need to be removed;
2°. LNG, LPG or CNG tank;
3°. gas valve;
4°. gas mixer;
5°. injection tubes, unless permanently sealed;
6°. injection tube adapter, unless permanently sealed;
7°. exterior filling valve, unless permanently sealed;
8°. high-pressure pipe, except for the part directly fixed to the underside of the vehicle.

d. wheelbase.
The wheelbase of passenger cars, commercial vehicles and buses with a permissible maximum mass not exceeding 3,500 kg, which may not deviate more than 2.0% from the value specified in the vehicle registration register. In case of doubt, the wheelbase will be measured. If the left and right-hand wheelbases are different by way of manufacture, the value of the wheelbase will be considered to be the average thereof;
e. presence of a coupling.
If it concerns a commercial vehicle or a bus with a permissible maximum mass of more than 3,500 kg and no value for the distance between the front of the vehicle and the centre of the coupling is specified in the vehicle registration register, the commercial vehicle or bus may not be equipped with a coupling. This does not apply if it concerns a fire engine for which, according to the vehicle registration register, a registration certificate was issued prior to 12 December 1983;
f. presence of multiple couplings.
If the commercial vehicle or a bus with a permissible maximum mass of more than 3,500 kg is equipped with multiple couplings, the value of the distance between the front of the vehicle and the centre of the coupling must be specified in the vehicle registration register for each coupling. This does not apply if it concerns a drawbar coupling intended to aid the steering process;
g. number of cylinders.
For passenger cars, commercial vehicles and buses with a permissible maximum mass not exceeding 3,500 kg, the number of cylinders will be checked if there is any doubt. If it concerns a Wankel engine, this check can be omitted.

**§ 3. Number plate**

**Article 3**
1. A passenger car, commercial vehicle, bus, trailer or three-wheeled motor vehicle must have yellow retro-reflective number plates, for trailers one, for a three-wheeled motor vehicle one or two plates, which bear a Euro symbol integrated in the laminate on the left-hand side. Exceptions are:
   a. vehicles for which the vehicle registration register states they are authorised to carry model 18.2 number plates; these vehicles are permitted to carry the small model number plates;
   b. vehicles taken into use befor to 1 January 1978; these vehicles are allowed to carry dark blue number plates;
   c. taxis must be fitted with light blue number plates as referred to in the Regulation Registrations and Number Plates, and
   d. vehicles for which temporary number plates have been issued up to the month stated on the plate; for a trailer, this concerns one plate and for a three-wheeled motor vehicle one or two plates.
2. Passenger cars, commercial vehicles, buses and three-wheeled motor vehicles as well as trailers with number plates are not allowed to display number plates other than those stated in this Appendix.

**Title 2. General construction method of the vehicle**

**Section 1. Vehicles without a full load-bearing frame**

**Article 4**
1. In this section, the terms below shall have the following meaning:
   rust damage: material that has disintegrated throughout the entire thickness due to corrosion.
2. Rust damage is expressed as an ‘E’ damage unit per part, per attachment of a part, or per section of the bottom plate.

**Article 5**
The parts and attachments of parts of motor vehicles with a self-supporting body listed in Annex 1 may not have more rust damage than 2E per part, per attachment of a part or per section of a bottom plate.

**Article 6**

The following procedure must be followed to determine the extent of rust damage in 'E' damage units:

a. the extent of rust damage per part, per attachment of a part or per section of the bottom plate is determined as a percentage according to the applicable assessment principle specified in this section;
b. the degree of rust damage to be used in the case of maximum loss of function of the damaged part, damaged attachment of a part or damaged section of the bottom plate is determined based on Annex 1;
c. the percentage of rust damage determined under a is multiplied by the degree of rust damage determined under b.

**Article 7**

1. The extent of rust damage to the longitudinal and cross members is determined according to the following assessment principles, whereby the highest percentage is decisive:
   a. the ratio expressed as a percentage between the damaged part of the circumference and the entire circumference of the cross-section, including a possible reinforcement of the longitudinal or cross member. The attachment flanges are not included in the calculation of the circumference of the cross-section, and
   b. the ratio expressed as a percentage between the length of the damage and the actual length of the longitudinal or cross member between the points of support as shown in Figure 1, or as described in the relevant part of Annex 1. The attachment flanges are included when determining the rust damage.
2. If a plate section combined with a preformed profile forms a tube, the entire unit is considered to be a longitudinal or cross member.

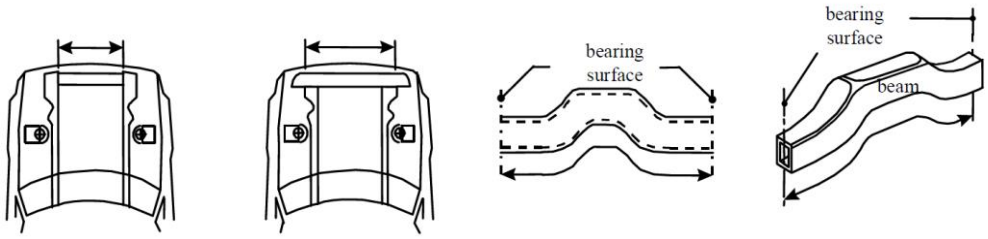



Figure 1. Length of longitudinal or cross members between the points of support

**Article 8**

1. To determine the extent of rust damage of the bottom plate of the passenger area, the bottom plate is divided into sections, as shown in Figure 2, after which each section is assessed separately.
2. The sections are formed by the following section lines:
   **Section line 1:** the centre tube or the longitudinal centre line.
   **Section line 2:** the beginning of the flat bottom plate.
   **Section line 3:** the cross member at the front of the front seats or, if there is no cross member at this location, the front of the front seats in their rearmost position.
   **Section line 4:** each front of the seats positioned directly behind the front seats in their rearmost position.
   **Section line 5:** the end of the bottom plate below the passenger area.

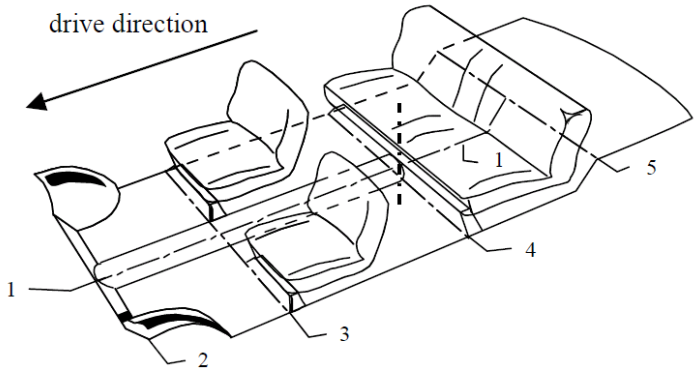



Figure 2. Division of the sections of the bottom plate of the passenger area

**Article 9**

1. The extent of rust damage to the bottom plate of the passenger area is determined according to the following assessment principles, whereby the highest percentage is decisive:
   a. the ratio expressed as a percentage between the damaged surface of the section and the entire surface of the section, and
   b. the ratio between the length of the damage at the edges of the section and the entire length of the edges of the section.
2. Rust damage that continues throughout multiple sections must be assessed as damage present on the largest of the sections affected.
3. In the case of double bottom plates, the top plate is assessed as specified in paragraph one; the bottom plate is assessed as a single large section.
4. If part of the bottom plate is also part of a longitudinal or cross member (tube), this part must be included in the determination of the surface area or edge length.

**Article 10**

The extent of rust damage to the wheel arches is determined according to the following assessment principles, whereby the highest percentage is decisive:

a. the ratio expressed as a percentage between the damaged surface and the entire surface, and
b. the ratio between the total length of the damage to the edges and the entire length of the edges, and
c. the ratio between the length of the damage per side of the wheel arch and the length of the joint between that side and another part.

**Article 11**

1. The extent of rust damage to plate sections, with the exception of the bottom plate and the wheel arches, is determined according to the following assessment principles, whereby the highest percentage is decisive:
   a. the ratio expressed as a percentage between the damaged surface and the entire surface, and
   b. the ratio between the length of the damage to the edges and the entire length of the edges.
2. If part of the plate section is also part of a longitudinal or cross member (tube), this part must be included in the determination of the surface area or edge length.

**Article 12**

1. The extent of rust damage to the attachments of parts, with the exception of the attachment of plate sections and wheel arches, is determined by estimating the reduction, expressed as a percentage, of the strength of the attachment of one part to another, in the area enclosed by an imaginary line at a distance of 100 mm around the attachment.
2. The rust damage outside the imaginary line will not be taken into account.

**Article 13**

Rust damage is assessed:

a. by performing a visual inspection, while the vehicle is raised over an inspection pit or on a lifting platform, and
b. in case of doubt:
   1 °. by using a small ball-peen hammer;
   2 °. by measuring with a measuring device of sufficient range.

**Section 2. Vehicles with a full load-bearing frame**

**§ 1. Chassis frame**

**Article 14**

1. In this paragraph, the terms below shall have the following meaning:
   rust damage: material that has partly disintegrated due to corrosion.
2. Rust damage in the chassis frame is expressed as a percentage per longitudinal member, cross member or profile.

**Article 15**

1. The longitudinal and cross members and axle attachments of the chassis frame, the towing system of a centre-axle trailer and a trailer with a rigid drawbar, and all the profiles that form part of the turntable bearing support, semi-trailer coupling or coupling plate, may not exhibit more rust damage than the percentage stated in Annex 2 of this Appendix.
2. The assessment of the extent of rust damage to the longitudinal and cross members of the chassis frame is based on the length of the longitudinal and cross members between the points of support.
3. Notwithstanding the requirements specified in the first paragraph, longitudinal and cross members of the chassis frame that serve only to support the loading floor must be considered supporting longitudinal and cross members, to which paragraph 2 of this section applies.
4. Notwithstanding the requirements specified in the first paragraph, longitudinal and cross members and axle attachments of the chassis frame that are made of sheet material with a maximum thickness of 2 mm are subject to the requirements in paragraph 2 of this section.
5. The requirements specified in section 1 apply to the self-supporting part of a partially self-supporting body in combination with a chassis frame.

**§ 2. Other parts**

**Article 16**

1. In this paragraph, the terms below shall have the following meaning:
   rust damage: material that has disintegrated throughout the entire thickness due to corrosion.
2. Rust damage is expressed as an ‘E’ damage unit per part or per attachment of a part.

**Article 17**

The parts and attachments of parts of motor vehicles listed in Annex 3 that do not have a self-supporting body, and trailers with a permissible maximum mass exceeding 3,500 kg are not permitted to have rust damage higher than 2E per part or attachment of a part.

**Article 18**

The following procedure must be followed to determine the extent of rust damage in ‘E’ damage units:

a. the extent of rust damage per part or per attachment of a part is determined as a percentage according to the applicable assessment principle;
b. the degree of rust damage to be used in the case of maximum loss of function of the damaged part or the damaged attachment of a part is determined based on Annex 3;
c. the rust damage percentage referred to in subsection a is multiplied by the degree of rust damage referred to in subsection b.

**Article 19**

1. The extent of rust damage to the longitudinal and cross members is determined according to the following assessment principles, whereby the highest percentage is decisive:
   a. the ratio expressed as a percentage between the damaged part of the circumference and the entire circumference of the cross-section, including a possible reinforcement of the longitudinal or cross member. The attachment flanges are not included in the calculation of the circumference of the cross-section, and
   b. the ratio expressed as a percentage between the length of the damage and the actual length of the longitudinal or cross member between the points of support as shown in Figure 3, or as described in the relevant part of Annex 3. The attachment flanges are included when determining the rust damage.
2. If a plate section combined with a preformed profile forms a tube, the entire unit is considered to be a longitudinal or cross member.

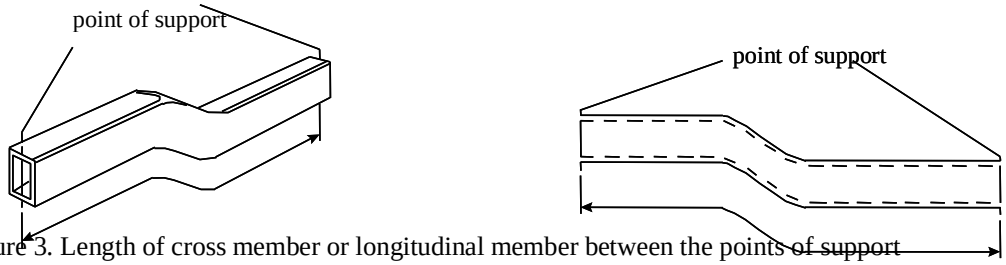



Figure 3. Length of cross member or longitudinal member between the points of support

**Article 20**

1. The extent of rust damage to the plate sections is determined according to the following assessment principles, whereby the highest percentage is decisive:
   a. the ratio expressed as a percentage between the damaged surface and the entire surface, and
   b. the ratio expressed as a percentage between the length of the damage to the edges and the entire length of the edges.
2. If part of the plate section is also part of a longitudinal or cross member (tube), this part must be included in the determination of the surface area or edge length.

**Article 21**

1. The extent of rust damage to the attachments of parts, with the exception of the attachment of plate sections, is determined by estimating the reduction, expressed as a percentage, of the strength of the attachment of one part to another, in the area enclosed by an imaginary line at a distance of 100 mm around the attachment.
2. The rust damage outside the imaginary line will not be taken into account.

**Article 22**

Rust damage is assessed:

a. by performing a visual inspection, while the vehicle is raised over an inspection pit or on a lifting platform, and
b. in case of doubt:
   1 °. by using a small ball-peen hammer;
   2 °. by measuring with a measuring device of sufficient range.

**Section 3. Rust damage repair**

**Article 23**

A rust damage repair must be carried out in such a way that the part, the attachment of the part or the section of the bottom plate can once again fulfil its original function.

**Article 24**

1. The following applies to all parts, attachments of parts or sections of the bottom plate for which a degree of rust damage has been determined:
   a. repairs using tailor-made parts, whereby each part is properly welded to the original material are permitted;
   b. the replacement of parts is permitted, provided that they are properly welded or attached with bolts, if the original attachment was established by means of bolts or rivets;
   c. a repair that has not been carried out in accordance with subsection a or b will be considered and assessed as rust damage, for which the scope of the repair is regarded as the scope of the rust damage unless otherwise demonstrated.
2. "Properly welded", as referred to in the first paragraph, subsections a and b shall be understood to mean:
   a. chain welds, which cover at least 50% of the circumference of the part to be welded and that are evenly distributed around this circumference, or
   b. plug welds with a diameter of at least 4 mm and a spacing not exceeding 20 mm.

**Article 25**

1. The towing device of a centre-axle trailer or a trailer with a rigid drawbar, the longitudinal and cross members and the axle attachments of the chassis frame, as referred to in paragraph 1 of Section 2, may not be repaired using plate sections placed over the rust damage.
2. Notwithstanding the first paragraph, the towing device of a centre-axle trailer or a trailer with a rigid drawbar, the longitudinal and cross members and the axle attachments of the chassis frame may be repaired using plate sections placed over the rust damage if the thickness of these plate sections is at least equal to thickest section of the part to be repaired. The plate sections must be welded properly. This means that chain welds must cover at least 75% of the circumference of the part to be welded. The welds must be evenly distributed around this circumference.
3. The profiles that form part of the turntable bearing support, the semi-trailer coupling or the coupling plate may not be repaired using plate sections placed over the rust damage.

**Article 26**

A different repair, as referred to in Articles 24 and 25, is permitted if this is demonstrated by means of documentation from the vehicle manufacturer. The repair must have been carried out in accordance with the vehicle manufacturer's instructions.

**Article 27**

The rust damage repair is assessed:

a. by performing a visual inspection, while the vehicle is raised over an inspection pit or on a lifting platform, and
b. in case of doubt, by measuring with a measuring device of sufficient range.

**Title 3. Engine and fuel systems**

**Section 2. Sound**

**§ 1. Passenger cars, commercial vehicles and buses**

**Article 30**

1. The sound level must be measured with the aid of a
   a. sound level meter;
   b. calibrated sound source;
   c. tachometer.
2. The equipment specified in the first paragraph shall comply with the requirements set out for the equipment concerned in Chapter 8 of this regulation.
3. The measurement conditions referred to in Article 31 must be taken into account when measuring the sound level.

**Article 31**

1. The measurement must take place in the open air.
2. The test site may not be subject to strong acoustic disruptions. This requirement is met if the surface of the site is made of concrete, asphalt, paving or a similar hard material.
3. The test site must at least have the dimensions of a rectangle, the sides of which are at least 3.00 m away from the passenger car, commercial vehicle or bus, as shown in Figure 4. No persons or objects that are not necessary for the measurement may be present within this rectangle. The passenger car, commercial vehicle or bus must be positioned in the rectangle in such a manner that the microphone is located at a distance of at least 1.00 m from any kerbstones.

4. The values indicated by the sound level meter for the ambient noise and the wind must be at least 10 dB(A) lower than the sound level specified in the vehicle registration register. This is checked by determining the background noise level before and after the measurement. The microphone of the sound level meter may be fitted with a suitable wind cover, provided that the influence of this on the sensitivity of the microphone is taken into account.
5. Before starting the measurement, the engine of the passenger car, commercial vehicle or bus must be brought to operating temperature.
6. The measurement must be performed on a stationary passenger car, commercial vehicle or bus.

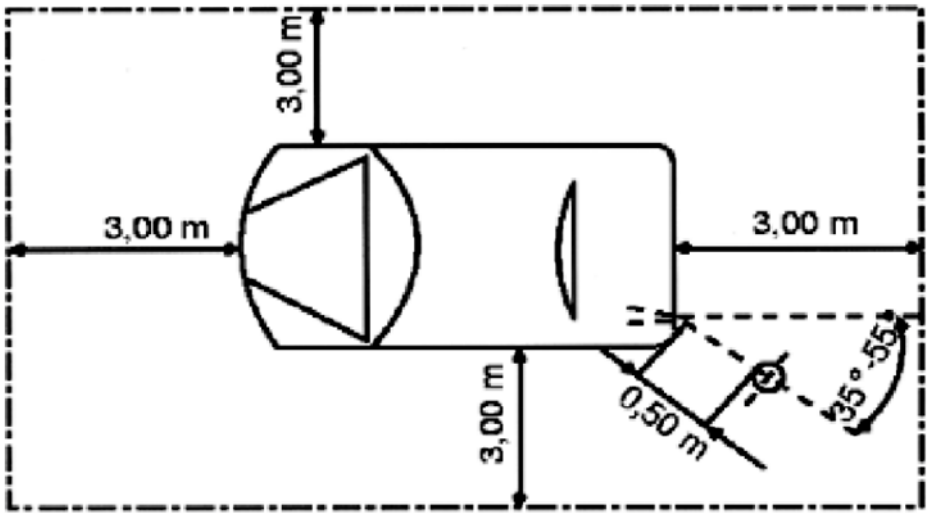



Figure 4. Dimensions of the test site.

**Article 32**

The measurement of the sound level is carried out based on the testing methods specified below:

a. before starting the measurement, the sound level meter is set to the time weighting 'F', formerly referred to as 'Fast', and the frequency weighting 'A';
b. the engine is at operating temperature once it has run under normal operating conditions for approximately fifteen minutes;
c. at the start and at the end of each series of measurements, the sound level meter must be calibrated according to the manufacturer's instructions with the aid of a calibrated sound source;
d. the difference between the sound pressure level of the calibrated sound source and the indication of the sound level meter may not exceed 1 dB(A). If this value is exceeded during the initial inspection, the sound level meter must be adjusted in such a manner that this requirement is met. If at the end of the series of measurements it is determined that this difference exceeds 1 dB(A), the series of measurements shall be considered invalid;
e. the microphone of the sound level meter must be placed in the position shown in Figure 5:

1 °. at the end of the exhaust pipe, at least 0.20 m above the road surface;
2 °. the diaphragm of the microphone is directed towards the end of the exhaust pipe at a distance of 0.50 m, whereby a deviation of 50 mm is allowed;
3 °. the maximum sensitivity axis of the microphone must be parallel to the road surface at an angle of no less than 35° and no more than 55° to the perpendicular plane in which the emission direction of the exhaust gases lies. The microphone must be positioned in such a way that the greatest distance between the microphone and the passenger car is achieved;
4 °. if the exhaust system has multiple exhaust pipes that are connected to one and the same silencer, the centres of which are no more than 0.30 m apart, the microphone must face the exhaust pipe that is closest to the outer contour of the passenger car, commercial vehicle or bus or that is located highest above the road surface. If the centres of the exhaust pipes are more than 0.30 m apart, a separate measurement must be performed for each pipe, whereby only the highest measured value will be used;

f. the speed of the engine is raised to the value specified in the vehicle registration register for the passenger car, commercial vehicle or bus concerned. If the vehicle registration register does not specify an engine speed, the engine of the passenger car, commercial vehicle or bus with a permissible maximum mass of no more than 3,500 kg will be raised to 3,500 $min^{-1}$ as far as it concerns a vehicle with a combustion engine with electric ignition and to 2,000 $min^{-1}$ as far as it concerns a vehicle with a combustion engine with compression ignition. For passenger cars, commercial vehicles and buses with a permissible maximum mass exceeding 3,500 kg, an engine speed of 1,500 $min^{-1}$ will be used;
g. after the value referred to in subsection f has been reached, the accelerator must be quickly released. The duration of the sound level measurement shall include the period during which the speed is kept constant and the entire duration of the reduction of the engine speed to the idle speed is achieved again;
h. at least one series of three measurements must be performed per measurement point, whereby:
1 °. the highest value the sound level meter has indicated will be used as a measured value for the measurement;
2 °. the measured value per measurement is rounded off at the nearest whole decibel;
3 °. only measured values that are obtained with three consecutive measurements and do not vary by more than 2 dB(A) may be used;
4 °. the highest of these three measured values shall be used as the measurement result

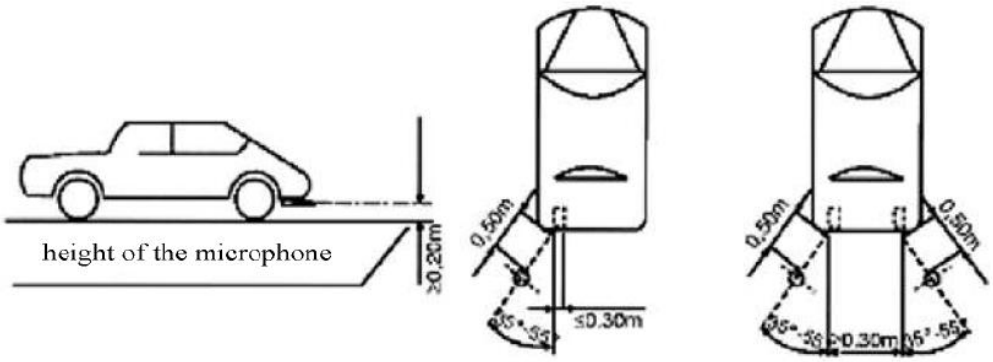



Figure 5. Positioning of the microphone.

**§ 2. Motorcycles and three-wheeled motor vehicles**

**Article 33**

1. The sound level must be measured with the aid of a:
   a. sound level meter;
   b. calibrated sound source;
   c. tachometer.
2. The equipment specified in the first paragraph shall comply with the requirements set out for the equipment concerned in Chapter 8 of this regulation.
3. The measurement conditions referred to in Article 34 must be taken into account when measuring the sound level.

**Article 34**

1. The measurement must take place in the open air.
2. The test site may not be subject to strong acoustic disruptions. This requirement is met if the surface of the site is made of concrete, asphalt, paving or a similar hard material.
3. The test site must at least have the dimensions of a rectangle, the sides of which are at least 3.00 m away from the motorcycle or the three-wheeled motor vehicle, except for the handlebars of the motorcycle or the three-wheeled motor vehicle, as shown in Figure 6. No persons or objects that are not necessary for the measurement may be present within this rectangle. The motorcycle or the three-wheeled motor vehicle must be positioned in the rectangle in such a manner that the microphone is located at a distance of at least 1.00 m from any kerbstones.

4. The values indicated by the sound level meter for the ambient noise and the wind must be at least 10 dB(A) lower than the sound level specified in the vehicle registration register. This is checked by determining the background noise level before and after the measurement. The microphone of the sound level meter may be fitted with a suitable wind cover, provided that the influence of this on the sensitivity of the microphone is taken into account.

5. Before starting the measurement, the engine of the motorcycle or the three-wheeled motor vehicle must be brought to operating temperature.
6. The measurement must be performed on a stationary motorcycle or three-wheeled motor vehicle.

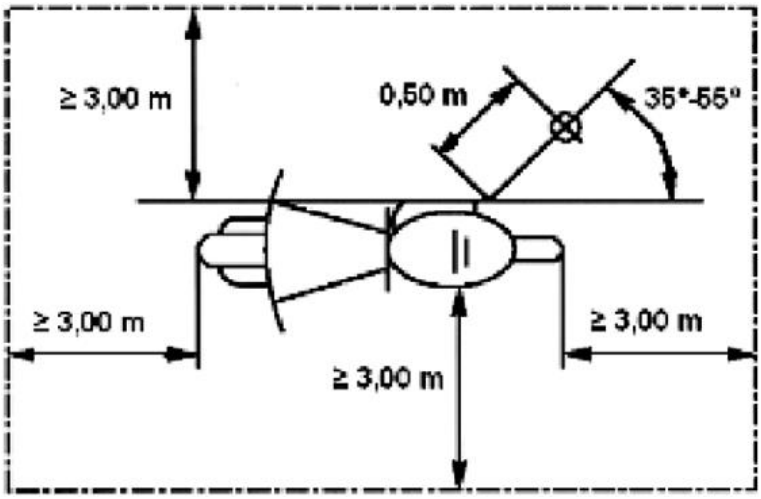


Figure 6. Dimensions of the test site.

**Article 35**

The measurement of the sound level is carried out based on the testing methods specified below:

a. before starting the measurement, the sound level meter is set to the time weighting 'F', formerly referred to as 'Fast', and the frequency weighting 'A';
b. the engine is at operating temperature once it has run under normal operating conditions for approximately fifteen minutes;
c. if the transmission cannot be disconnected, it must be possible for the driven wheel to rotate freely;
d. at the start and at the end of each series of measurements, the sound level meter must be calibrated according to the manufacturer's instructions with the aid of a calibrated sound source;
e. the difference between the sound pressure level of the calibrated sound source and the indication of the sound level meter may not exceed 1 dB(A). If this value is exceeded during the initial inspection, the sound level meter must be adjusted in such a manner that this requirement is met. If at the end of the series of measurements it is determined that this difference exceeds 1 dB(A), the series of measurements shall be considered invalid;
f. the microphone of the sound level meter must be placed in the position shown in Figure 7:

1 °. at the end of the exhaust pipe, at least 0.20 m above the road surface;
2 °. the diaphragm of the microphone is directed towards the end of the exhaust pipe at a distance of 0.50 m, whereby a deviation of 50 mm is allowed;
3 °. the maximum sensitivity axis of the microphone must be parallel to the road surface at an angle of no less than 35° and no more than 55° to the perpendicular plane in which the emission direction of the exhaust gases lies; the microphone must be positioned such that the greatest distance between the microphone and the motorcycle or the three-wheeled motor vehicle is achieved;
4 °. if the exhaust system has multiple exhaust pipes that are connected to one and the same silencer, the centres of which are no more than 0.30 m apart, the microphone must face the exhaust pipe that is closest to the outer contour of the motorcycle or the three-wheeled motor vehicle or that is located highest above the road surface. If the centres of the exhaust pipes are more than 0.30 m apart, a separate measurement must be performed for each pipe, whereby only the highest measured value will be used;

g. if the vehicle registration register specifies a dB(A) value and engine speed, the speed of the engine is raised to the value specified in the vehicle registration register for the motorcycle or the three-wheeled motor vehicle concerned;

If no dB(A) value is specified in the vehicle registration register of the motorcycle, but is does indicate an engine speed at which the maximum power of the motorcycle in question is reached (RPM n), then the dB(A) value will be determined in accordance with Table 1 and the engine speed at:

1o. $^{3}/_{4}$ n, if RPM n is less than or equal to 5000 $min^{-1}$; and

2o. $^{1}/_{2}$ n, if RPM n is higher than 5000 $min^{-1}$.

In all other cases, the dB(A) value is determined in accordance with Table 1, and the engine speed is determined in accordance with the following table:

| | |
|---|---|
| Year of construction before 1960 | - 2-stroke: 2,250 $min^{-1}$<br>- 4-stroke: 2,000 $min^{-1}$ |
| Year of construction as of 1960 | - 2-stroke: 4,500 $min^{-1}$<br>- 4-stroke: 4,000 $min^{-1}$ |

h. after the value referred to in subsection g has been reached, the throttle must be quickly released. The duration of the sound level measurement shall include the period during which the speed is kept constant and the entire duration of the reduction of the engine speed to the idle speed is achieved again;

i. at least one series of three measurements must be performed per measurement point, whereby:

1 °. the highest value the sound level meter has indicated will be used as a measured value for the measurement;

2 °. the measured value per measurement is rounded off at the nearest whole decibel;

3 °. only measured values that are obtained with three consecutive measurements and do not vary by more than 2 dB(A) may be used;

4 °. the highest of these three measured values shall be used as the measurement result.

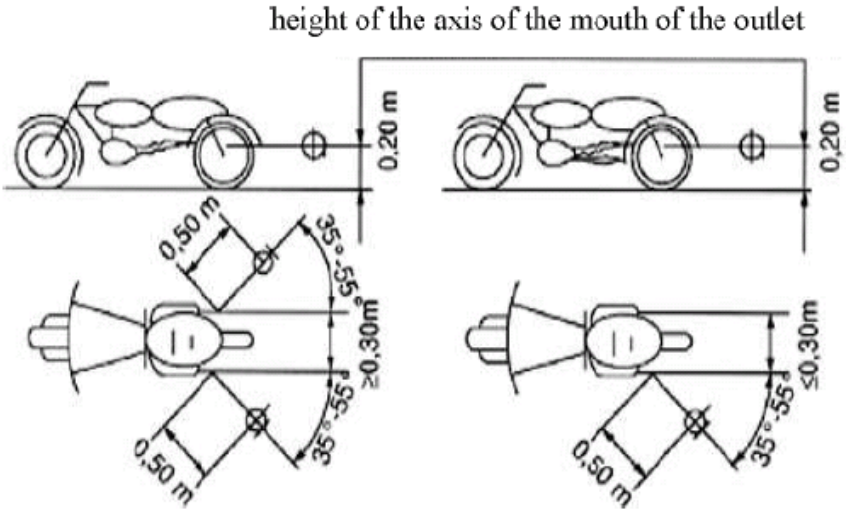



Figure 7. Positioning of the microphone.

Table 1. Maximum sound value motorcycle

| Cylinder capacity up to | Maximum permissible value |
|---|---|
| 80 cm3 | 91 dB(A) |
| 125 cm3 | 92 dB(A) |
| 350 cm3 | 95 dB(A) |
| 500 cm3 | 97 dB(A) |
| 750 cm3 | 100 dB(A) |
| 1,000 cm3 | 103 dB(A) |
| > 1.000cm3 | 106 dB(A) |

**Section 3. Emissions**

**§ 1. Carbon monoxide**

**Article 40 Inspection of the emission control system**

1. The proper operation of the emission control system is inspected by measuring the lambda value and the carbon monoxide content of the exhaust gases at increased speed and by measuring the carbon monoxide content at idling speed.
2. Prior to each measurement, it is checked whether the engine and the emission control system are at operating temperature. This requirement is met if the engine has run at a speed of approximately 3,000 RPM for three minutes, and:
   a. a test drive has been performed, or
   b. the engine oil temperature is at least 80ºC.

   The engine oil temperature must be checked with the aid of an appropriate oil temperature gauge.

**Article 41 Carbon monoxide content at idling speed**

1. The exhaust gases emitted by passenger cars, commercial vehicles and buses with a combustion engine with an electric ignition may, when running stationary and at running temperature, not contain more carbon monoxide than:
   a. 4.5 % vol. carbon monoxide, if the vehicle was taken into use after 31 December 1973, but prior to 1 October 1986;
   b. 3.5 % vol. carbon monoxide, if the vehicle was taken into use after 30 September 1986, but prior to 1 July 2002;
   c. 0.5 % vol. carbon monoxide, if the vehicle was taken into use after 31 December 1985, but prior to 1 July 2002 and the vehicle is equipped with an emission control system comprising a catalytic converter and a lambda probe;
   d. 0.3 % vol. carbon monoxide, if the vehicle was taken into use after 30 June 2002;
   e. 1.5 % vol. carbon monoxide, if the vehicle was taken into use after 31 December 1973, but prior to 1 July 2002 and, according to the vehicle registration register for that vehicle, the vehicle runs on gas or liquefied gas;
   f. 0.5 % vol. carbon monoxide, if the vehicle was taken into use after 30 June 2002 and, according to the vehicle registration register for that vehicle, the vehicle runs on gas or liquefied gas.

   When determining the carbon monoxide content, the second decimal does not need to be taken into consideration.
2. The first paragraph is not applicable to hybrid electric vehicles.

**Article 42 Carbon monoxide content and lambda value at increased RPM**

1. Passenger cars, commercial vehicles and buses equipped with a combustion engine with electric ignition and provided with an emission control system must comply with the requirements below to check the proper functioning of this system. The carbon monoxide content and the lambda value may not exceed the following values at increased RPM and with the engine at operating temperature:
   a. 0.3 % vol. carbon monoxide, if:
   1 °. it concerns a passenger car that was taken into use after 31 December 1992, but prior to 1 July 2002, with a lambda value between 0.97 and 1.03;
   2 °. it concerns a commercial vehicle with a permissible maximum mass not exceeding 3,500 kg, which was taken into use after 31 December 1994, but prior to 1 July 2002, with a lambda value between 0.97 and 1.03;
   b. 0.2 % vol. carbon monoxide, if the vehicle was taken into use after 30 June 2002, with a lambda value between 0.97 and 1.03;
2. The values stated in the first paragraph, under a and b, are determined at an increased RPM of between 2,000 RPM and 3,200 RPM, during which all electrical power consumers may be switched on.
3. If the vehicle is equipped with a rotary engine, the inspection of the proper functioning of the emission control system may be omitted.
4. If the vehicle is equipped with an LPG installation, the measurement must be carried out at increased RPM if:
   a. it concerns a passenger car that was taken into use after 31 December 1997;

b. it concerns a commercial vehicle or bus with a permissible maximum mass not exceeding 3,500 kg, which was taken into use after 31 December 1997.

5. When determining the carbon monoxide content at increased RPM, the second decimal does not need to be taken into consideration. When determining the lambda value, the third decimal does not need to be taken into consideration.
6. The first four paragraphs do not apply:
   a. to vehicles included on the following list of vehicle-specific data; or
   b. if this is demonstrated by means of documentation from the vehicle manufacturer.
   The requirements set out in this list or the requirements included in this documentation shall apply to the vehicles referred to under a and b. The list is not applicable to motor vehicles equipped with an LPG installation.
7. The first five paragraphs do not apply to series hybrid electric vehicles.

**Article 43 Testing methods**

1. The inspections referred to in Articles 41 and 42 are carried out by performing measurements on a stationary passenger car, commercial vehicle or bus with the aid of a carbon monoxide meter which has been switched on for at least the minimum preheating time specified by the manufacturer.
2. Prior to each measurement, it is checked whether:
   a. the engine is running at idle speed and is at operating temperature, and
   b. the crankcase ventilation is connected to the vehicle.
3. Prior to each measurement, it is checked whether the sampling system is in good working condition, paying special attention to damage of the sampling tube and probe.
4. The probe must be inserted at least 0.30 m into the outlet of the exhaust system. The value reached after 30 seconds shall be taken as the final value of a measurement.
5. The increased RPM must be checked with the aid of a tachometer.
6. If the exhaust system has multiple outlets, the measurement shall only be performed at one outlet.
7. If the vehicle registration register specifies more than one fuel, only the environmental requirements regarding LPG or petrol will be checked. This is subject to the following:
   a. only for LPG, if ‘G’ is indicated for fuel or a combination of fuels;
   b. only for petrol, if ‘B’ is indicated for fuel or a combination of fuels without ‘G’ being indicated as well.
8. Notwithstanding the previous paragraphs, it is permissible for vehicles equipped with an emission-related on-board diagnostic system (EOBD system), except vehicles with an LPG or CNG installation, to carry out the inspection referred to in Article 41 by reading out the EOBD system with the aid of the reader. The display may contain the P-code, a descriptive text, or a combination of both. The requirements of Article 41 are met if it concerns an error-free EOBD system. This requires the EOBD system to have completed a number of internal checks, the so-called readiness test. If emission-related error codes are detected or the readiness test is not completed, an assessment will still be made in accordance with the first up to and including the eighth paragraph of this article.

**List of vehicle-specific data pertaining to Article 42, fifth paragraph.**

| BRAND | MODEL | ENGINE CODE (on engine or type plate) | MAX. CO% AT INCREASED RPM | LAMBDA VALUE AT INCREASED RPM | INCREASED RPM BETWEEN |
|---|---|---|---|---|---|
| Aston Martin | V8 Virage Volante | 6.3 behind engine number | 3.5. | 1.2 - 1.4 | 2500 - 2700 |
| | If the vehicle is equipped with a fully automatic gearbox, the engine may only run for a maximum of 1 minute at 2500 RPM to bring the emission control system up to temperature. It is recommended to perform a test drive to bring the engine up to temperature (min. 80°C). | | | | |
| BMW | All models | N43...<br>N53… | 0.2<br>0.2 | 0.7 – 4.0<br>0.7 – 4.0 | 2300 - 2700<br>2300 - 2700 |
| Citroën | ZX and Xantia<br>ZX, Xsara and Xantia<br>C5 2.0 HPI | XU5JP (BFZ)<br>XU7JP (LFZ)<br>RLZ | 0.3<br>0.3<br>> 0.3 | 0.97 - 1.03<br>0.97 - 1.03<br>> 4.00 or 0.97 - 1.03 with disconnected EGR valve | 1400 - 1600<br>1400 - 1600<br>2250 - 3000 |
| | The following functions must be switched on at the increased RPM: Headlamps, rear window heating, air-conditioner (at the highest capacity) and for vehicles with power steering, steering wheel at maximum steering angle. If the vehicle is equipped with a fully automatic gearbox, the unloaded increased RPM may not exceed 2400 RPM. | | | | |
| Daimler | If the vehicle is equipped with a fully automatic gearbox, the engine may only run for a maximum of 1 minute at 2500 RPM to bring the emission control system up to temperature. It is recommended to perform a test drive to bring the engine up to temperature (min. 80°C). | | | | |
| Ford | All models | | 0.3 | 0.95 - 1.09 | 2000 - 3200 |
| | Fiesta 1.4 i<br>Escort 1.4 i<br>Orion 1.4 i<br>Type CVH | Motor CVH<br>Code F6E<br>Code F6G<br>Code F6F | 0.3<br>0.3<br>0.3<br>0.3 | 0.95 - 1.09<br>0.95 - 1.09<br>0.95 - 1.09<br>0.95 - 1.09 | 3600 - 3900<br>3600 - 3900<br>3600 - 3900<br>3600 - 3900 |
| Ford | Mustang | | 0.3 | 1.57 - 1.79 | 2500 - 3200 |
| | This applies to vehicles of which the 8th digit of the vehicle identification number is the letter T. The air pump may not be switched off during the measurement. | | | | |
| Jaguar | If the vehicle is equipped with a fully automatic gearbox, the engine may only run for a maximum of 1 minute at 2500 RPM to bring the emission control system up to temperature. It is recommended to perform a test drive to bring the engine up to temperature (min. 80°C). | | | | |
| Rover<br>Landrover<br>Mini<br>MG | all models<br>idem<br>idem<br>idem | | 0.3 | 0.95 - 1.09 | 2000 - 3200 |
| Mitsubishi | Carisma GDI | | 0.3 | 3.50 - 4.00 or 0.97 - 1.03 if function(s) are switched on | 2500 - 3000 |
| Peugeot | 306<br>405<br>405<br>406<br>406 | XU7JP (LFZ)<br>XU5JP (BFZ)<br>XU7JP (LFZ)<br>XU5JP (BFZ)<br>RLZ | 0.3<br>0.3<br>0.3<br>0.3<br>> 0.3 | 0.97 - 1.03<br>0.97 - 1.03<br>0.97 - 1.03<br>0.97 - 1.03<br>> 4.00 or 0.97 - 1.03 with disconnected EGR valve | 1400 - 1600<br>1400 - 1600<br>1400 - 1600<br>1400 - 1600<br>2250 - 3000 |
| | The following functions must be switched on at the increased RPM: Headlamps, rear window heating, air-conditioner (at the highest capacity) and for vehicles with power steering, steering wheel at maximum steering angle. If the vehicle is equipped with a fully automatic gearbox, the increased RPM may not exceed 2400 RPM. | | | | |
| Toyota | Carina 1600/1800 | 4AFE<br>7AFE | 0.3<br>0.3 | 0.97 - 1.60<br>0.97 - 1.60 | 2400 - 2600<br>2400 - 2600 |
| | If the vehicle is equipped with a fully automatic gearbox, a test drive of at least 5 kilometres must be made to bring the emission control system and the engine up to temperature. | | | | |
| Volvo | 400 series<br>850 series<br>940 series<br>960 series | | 0.3<br>0.3<br>0.3<br>0.3 | 0.96 - 1.04<br>0.96 - 1.04<br>0.96 - 1.04<br>0.96 - 1.04 | 2000 - 3200<br>2000 - 3200<br>2000 - 3200<br>2000 - 3200 |
| | If vehicles from the 400 series are equipped with a fully automatic gearbox, the increased RPM may not exceed 1500 RPM. | | | | |

**§ 2. Soot**

**Article 44 Measurement of soot**

1. For passenger cars, commercial vehicles and buses with a combustion engine with compression ignition, the amount of soot, expressed as the absorption coefficient (k value) of the exhaust gases, may not exceed the following values:
   a. 3.0 $m^{-1}$ for turbo-charged engines, if the vehicle was taken into use after 31 December 1979 but prior to 1 July 2008;
   b. 2.5 $m^{-1}$ for naturally aspirated engines, if the vehicle was taken into use after 31 December 1979 but prior to 1 July 2008;
   c. 1.5 $m^{-1}$ for turbo-charged or naturally aspirated engines, if the vehicle was taken into use after 30 June 2008 but prior to 1 January 2018;
   d. 0.7 $m^{-1}$ for turbo-charged or naturally aspirated engines, if the vehicle was taken into use after 31 December 2017.
2. In order to determine the maximum amount of soot as referred to in the first paragraph, the following measurement values must be entered into the soot meter:
   a. the idle speed. This concerns the actual idle speed, whereby the following values must be entered into the soot meter:
   1°. a minimum RPM of 400 $min^{-1}$;
   2°. a maximum RPM of 1,000 $min^{-1}$;
   b. the control speed. The control speed is estimated. An ample margin is used for entering the minimum and maximum speed, to ensure the estimated control speed falls within these values; and
   c. a minimum engine oil temperature of 60°C.
3. If the passenger car, commercial vehicle or bus is equipped with a Comprex charger, or if it concerns a series hybrid electric vehicle, the soot level measurement is omitted.
4. If a passenger car, commercial vehicle or bus with a permissible maximum mass not exceeding 3,500 kg is equipped with a fully automatic gearbox:
   a. the engine oil is brought up to temperature running the engine at idle or by taking a drive, and
   b. no more than six measurements will be performed per test.
5. The engine oil temperature must have reached the minimum value. If it is technically not possible to measure the oil temperature, causing the soot meter to indicate that the oil temperature is too low, the measurement may be performed with the protection switched off. If the temperature sensor is not placed inside the engine, because it is clear that the engine oil is at the required temperature, the measurement may also be performed with the protection switched off.
6. The idle speed must fall within the values entered into the soot meter. If this is not the case, the idle speed of the engine must be adjusted to a value between the entered values. After this, the measurement can be continued. If adjustment is not possible or desirable, the measurement must be stopped and the vehicle cannot be approved.
7. The control speed must fall within the values entered into the soot meter. If this is not the case, the control speed in the soot meter must be adjusted to ensure the control speed falls within the entered values.
8. If it becomes apparent during the inspection that the fuel pump is configured in such a way that the maximum speed of the vehicle is below 60 km/hour, the vehicle will still fail to be approved. In such a case, the fuel pump must be readjusted, after which the soot level measurement must be repeated.
9. The measurement procedure may be discontinued if the soot meter indicates that the absorption coefficient of the first or second measurement is less than or equal to the maximum absorption coefficient minus 0.5 $m^{-1}$, whereby the requirements in the second up to and including fourth paragraph are complied with.

10. If the absorption coefficient must be determined based on the soot test strip because the absorption coefficient of the first and second measurement is not less than or equal to the maximum absorption coefficient minus 0.5 $m^{-1}$, the differences of the control speeds of the measurements with which the average absorption coefficient may be determined may not exceed 10% of the highest control speed. The difference between the absorption coefficient (the bandwidth) of three consecutive tests may not exceed:
    - 0.5 $m^{-1}$ if the calculated k value is lower than or equal to 2.5 $m^{-1}$, and
    - 0.7 $m^{-1}$ if the calculated k value is higher than 2.5 $m^{-1}$.

**Article 45 Testing methods**

1. The inspection is carried out by performing measurements on a stationary passenger car, commercial vehicle or bus with the aid of a soot meter which has been switched on for at least the minimum preheating time specified by the manufacturer.
2. Prior to each measurement, it is checked whether the sampling system and the corresponding connection cables are in good working condition, paying special attention to possible damage.
3. The probe must be inserted into the outlet of the exhaust system as described in the manual of the corresponding soot meter. Any instructions in the manual regarding the probe to be used must be followed.
4. If the exhaust system has multiple outlets, the measurement shall only be performed at one outlet.
5. The engine oil temperature must be measured with the aid of a temperature sensor, which must be placed in the engine as described in the manual of the corresponding soot meter. Any instructions in the manual regarding the temperature sensor to be used must be followed.
6. The idle speed and the control speed must be entered into the soot meter and verified using a tachometer. If necessary, the idle speed is adjusted before the measurement is started. Any instructions in the manual must be followed.
7. During each measurement, the accelerator pedal must be pressed to its limit quickly and without interruption within one second.

**§ 3 Emission-related on-board diagnostic system (EOBD)**

**Article 45a**

This paragraph applies to the extent that the vehicle is equipped with an emission-related diagnostic on-board system, this system is equipped with a well-functioning warning device and communication between the display device and the vehicle is possible.

**Article 45b**

1. The presence and proper functioning of the warning device of the emission-related on-board diagnostic system are inspected visually or audibly. The warning device of the vehicle must give an optical or audible signal when the ignition is switched on.
2. Notwithstanding the requirements specified in the first paragraph, the reader must be connected to the emission-related on-board diagnostic system. It must then be determined whether the status of the warning device as displayed on the reader corresponds to the actual status of the warning device in the vehicle.

**Article 45c**

If Article 45b is complied with and the display device does not display error codes starting with the letter P in mode 03 and the readiness test is completed, the EOBD procedure has been successfully completed.

**§ 4 Particles**

**Article 45e. Control operation of the particulate filter**

1. The proper functioning of the particulate filter is checked by measuring the number of particles per cubic centimeter in the exhaust gases.
2. The test referred to in the first paragraph shall be carried out at idle speed.

**Article 45f. Number of particles at idle speed**

The exhaust gases from passenger cars, commercial vehicles and buses with a compression-ignition combustion engine and particulate filter shall not contain more than 1,000,000 particles per cubic centimetre at idle speed.

**Article 45g. Method of inspection**

1. The check referred to in Article 45e shall be carried out by measuring a stationary passenger car, commercial vehicle or bus with a particulate counter which has been under electrical voltage for at least the heating time specified by the manufacturer of the particulate counter.
2. For each test, the sampling system shall be checked to be in good condition, with particular attention to damage to the sampling tube and probe.
3. The probe shall be inserted at least 0,30 m into the outlet of the exhaust system.
4. If an exhaust system with one particulate filter has more than one outlet, the check is limited to one outlet.
5. If an exhaust system contains several particulate filters, a check shall be carried out in the outlet of each particulate filter.

**Title 4. Axles**

**§ 1. Steering knuckles**

**Article 46**

1. In addition to any possible original amount of play, kingpins, bearings and tubes may not exhibit more play due to wear and tear than:
   a. in the radial direction, as shown in Figure 11: 1.5 mm in the top or bottom pivot point, and 2.0 mm in the top and bottom pivot points jointly;
   b. in the axial direction, as shown in Figure 11: 1.0 mm.
2. The original amount of play referred to in the first paragraph is determined based on the workshop manual or information from the manufacturer of the relevant part.

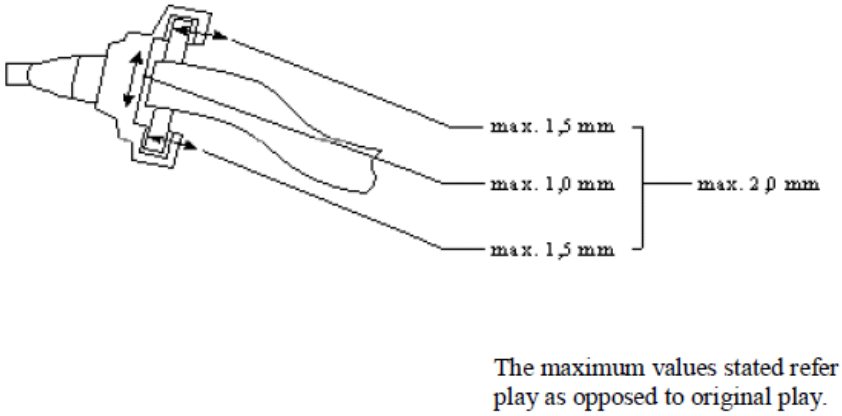



Figure 11. Play in the steering knuckle

**Article 47**

1. In addition to any possible original amount of play, ball joints may not exhibit more play due to wear and tear than:
   a. 1.0 mm, in the radial direction, as shown in Figure 12;
   b. 1.0 mm, in the axial direction, as shown in Figure 12:
2. The original amount of play referred to in the first paragraph that is the result of pushing the spring element into the ball joint, is determined:
   a. with the aid of the workshop manual or similar information, or
   b. by pushing in a new ball bearing.

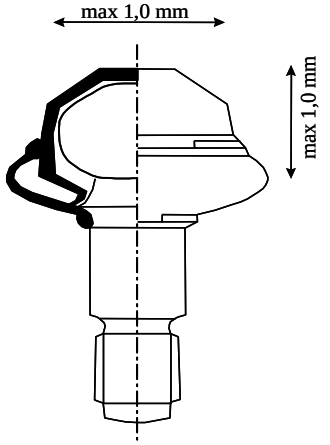



Figure 12 Play in the ball joint

**§ 2. Pivot points**

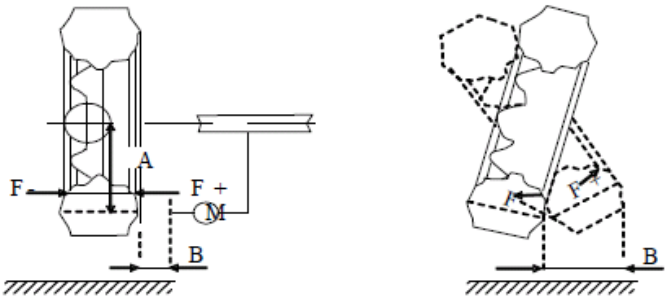
**Article 48**

1. The pivot points in a fully independent wheel suspension other than those referred to in Articles 46 and 47, except for ball joints, may:
   a. not have more play in the load-bearing direction due to wear and tear than 1.0 mm, without considering the elasticity of the rubber;
   b. not exhibit contact points caused by sideways movement.
2. The first paragraph is not applicable to the top pivot point of a wheel guidance system which combines elements of the steering, suspension and shock absorption, the so-called McPherson wheel suspension system.
3. If the pivot point concerns a ball joint, it may not exhibit more play due to wear and tear than:
   a. 1.0 mm, in the radial direction;
   b. 1.0 mm, in the axial direction.

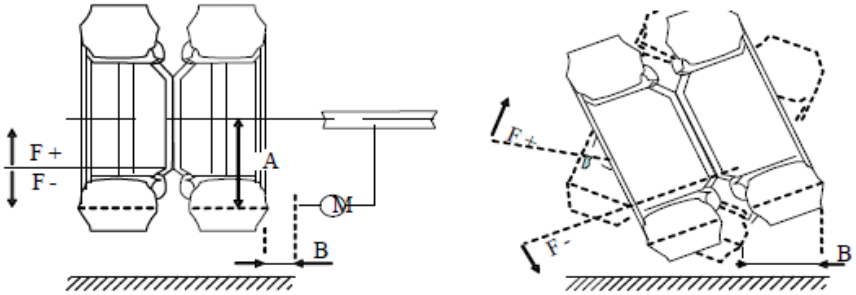
**§ 3. Wheel bearings**

**Article 49**

1. The play of wheel bearings or their seal may not be such that the range of movement exceeds 0.5% of the distance between the centre line of the axle or the shaft journal to the measuring point, as shown in Figure 13.
2. For vehicles with full-floating rear axles, the axial range of movement, as shown in Figure 14, may not exceed 0.5 mm, unless higher values are allowed for the relevant construction, which is determined based on the workshop manual or similar information.
3. For axles with a seal in the differential, the value stated in the second paragraph is 1.5 mm.




A = distance from centre of axle(journal) to measuring point
B = ability to move at the point of measurement
F = applied force
M = dial gauge




A = distance from centre of axle(journal) to measuring point
B = ability to move at the point of measurement
F = applied force
M = dial gauge

Figure 13. Play in the wheel bearings

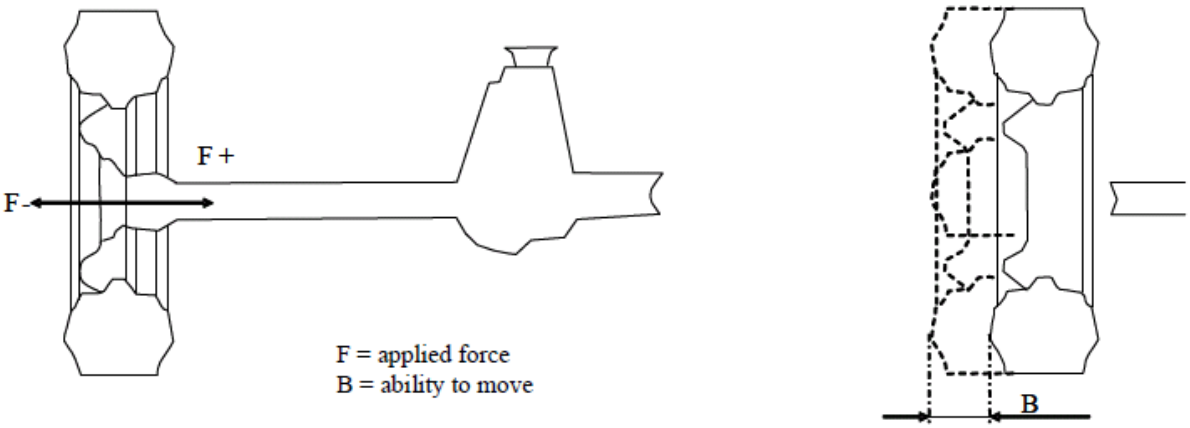



Figure 14. Full-floating rear axle

**Title 5. Suspension**

**§ 1. Load index**

**Article 50**

1. If the maximum load per axle of a commercial vehicle, bus or trailer taken into use after 31 December 1997 is specified in the corresponding vehicle registration register, the following procedure must be followed per axle:
   a. the maximum load per axle specified in the vehicle registration register is divided by the number of tyres on that axle;
   b. the load index pertaining to the maximum axle load per tyre established under a is determined based on Annex 4;
   c. the load index of each tyre on that axle may not be lower than the load index established under b.
2. If there is a tyre group with two successive load indexes, the requirements specified in the first paragraph, subsection a shall, in case of a single installation, apply to the first load index specified, and in case of a double installation, to the second load index.
3. The value determined in the first paragraph, under a will be:
   a. reduced by 4% if it concerns a trailer with twin-mounted passenger vehicle tyres;
   b. reduced by 10% if it concerns:
   1 °. a trailer with a permissible maximum load under the axle or axles not exceeding 3,500 kg, equipped with single-mounted passenger vehicle tyres;
   2 °. a refuse vehicle;
   3 °. a cleaning vehicle;
   4 °. a road sweeper;
   5 °. a spray vehicle;
   c. reduced by 15% if it concerns a bus with a technically permissible maximum mass exceeding 5,000 kg designed for the transport of standing passengers in addition to seated ones.
4. The value determined in the first paragraph, under a can be reduced by a percentage in accordance with Annex 5:
   a. at a speed of 100 km/h, if it concerns a trailer with a technically permissible maximum mass exceeding 750 kg;
   b. at a speed of 90 km/h, if it concerns a commercial vehicle with a speed limiter;
   c. at a speed of 100 km/h, if it concerns a bus with a speed limiter, or
   d. if a maximum speed is specified in the vehicle registration register or the registration certificate.

**Title 6. Steering equipment**

**§ 1. Steering coupling**

**Article 51 Steering coupling inspection**

1. The flexible material of the coupling may not exhibit 50% or more damage due to crack formation or detachment of the vulcanised rubber over any entire cross-section (in one plane), as shown in figure 15.
2. The first paragraph is not applicable to trailers with a permissible maximum mass exceeding 3,500 kg.

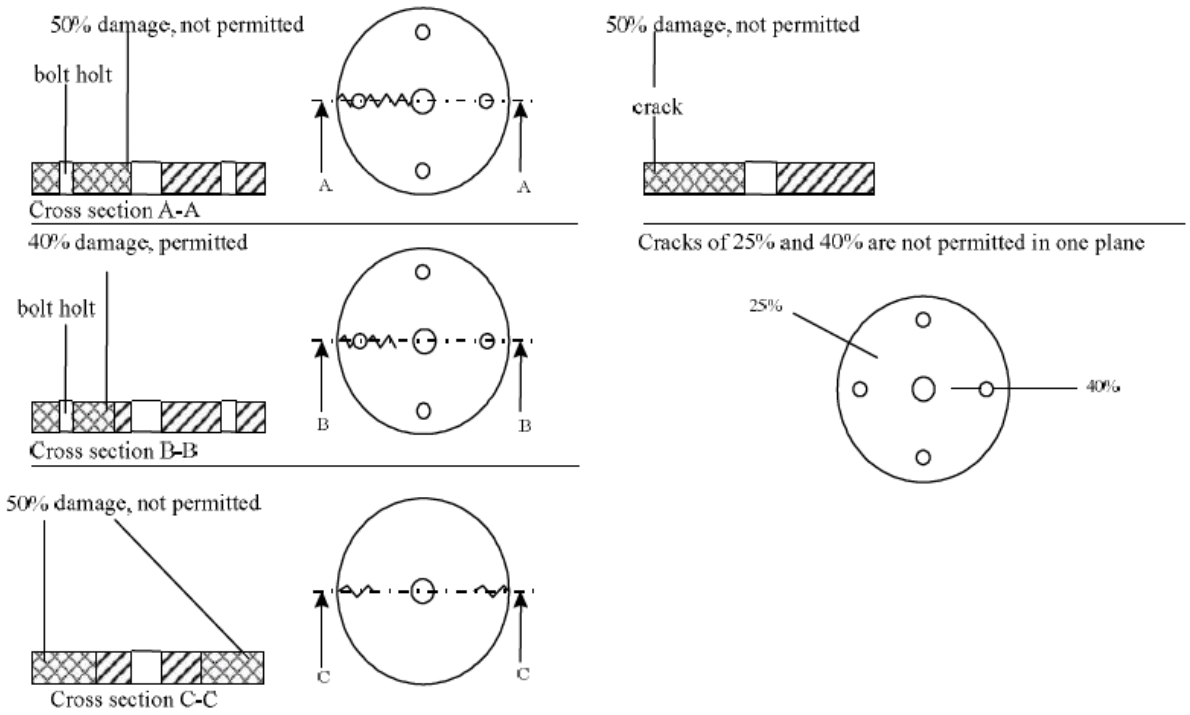



Figure 15. Flexible coupling of the steering equipment

**§ 2. Steering ball joints**

**Article 52 Maximum play in steering ball joints**

1. In addition to any possible original amount of play, steering ball joints and the other steering connections may not exhibit more play due to wear and tear than:
   a. 1.0 mm, in the radial direction, as shown in Figure 16;
   b. 1.0 mm, in the axial direction, as shown in Figure 16:
2. The original amount of play of the steering ball joint referred to in the first paragraph that is the result of pushing the spring element into the ball joint, is determined:
   a. based on the workshop manual or information from the manufacturer of the relevant part, or
   b. by pushing in a new ball bearing.

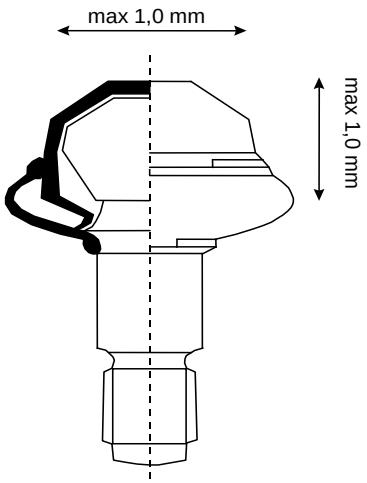



Figure 16. Play in the steering ball joint

**Title 7. Brake system**

**Section 1. Components of the brake system**

**§ 1. Brake line**

**Article 53**
A brake line may not be affected by corrosion to such an extent that pitting can still be observed at the surface after removal of the corrosion, as shown in Figure 17.

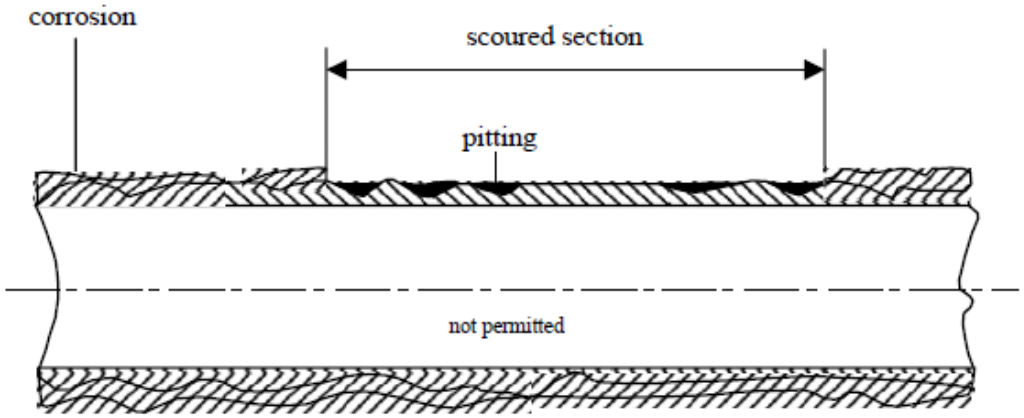



Figure 17 Brake line

**§ 2. Brake disc**

**Article 54 Brake disc**
1. A brake disc may not be affected by corrosion to such an extent that the width of the effective part amounts to less than 50% of the maximum width of the brake pad across the entire circumference of the brake disc.
2. The effective part, as referred to in the first paragraph, shall mean: an almost smooth surface without permanent corrosion formation (“shiny” part).

**§ 3. Brake hose**

**Article 55 Brake hose**
Brake hoses may:
a. not show evidence of sharp bends or twists, and
b. not deformations in the hydraulic brake systems.

**§ 4. Testing methods**

**Article 56 Testing methods**
The requirements set out in this section are assessed by performing a visual inspection, while the vehicle, except if this is a three-wheeled motor vehicle, is raised over an inspection pit or on a lifting platform.

## Section 2. Brake deceleration of passenger cars, commercial vehicles, buses and trailers

### § 1. Method for determining the brake deceleration

**Article 57 Method for determining the brake deceleration of passenger cars, commercial vehicles, buses and trailers**

1. The inspection of the brake deceleration of passenger cars, commercial vehicles, buses and trailers takes place by performing a road test using a self-registering brake deceleration meter or by performing a test on a plate brake tester or a roller brake tester.
2. When the measurement tools referred to in the first paragraph are used, the pedal force is measured with the aid of a pedal force meter only in the case of doubt.
3. During the periodic inspection for the purpose of issuing an inspection report, the inspection of the brake deceleration of vehicles with a permissible maximum mass not exceeding 3,500 kg must, in deviation from the first paragraph, be performed on a plate brake tester as described in paragraph 3 of this section, or on a roller brake tester as described in paragraph 2.1 of this section.
4. During the periodic inspection for the purpose of issuing an inspection report, the inspection of the brake deceleration of vehicles with a permissible maximum mass exceeding 3,500 kg as well as trailers with a permissible maximum mass exceeding 3,500 kg must, in deviation from the first paragraph, be performed on a roller brake tester as described in paragraph 2.1 and 2.2 of this section.
5. The third and fourth paragraph do not apply to vehicles which, for technical reasons, cannot be brake-tested on a roller brake tester or plate brake tester. These vehicles include:
   a. vehicles wider than 2.60 m;
   b. vehicles with a wheel diameter too small to perform the test;
   c. vehicles equipped with a permanent, non-automatic or manually disengageable drive on more than one axle;
   d. trailers with a permissible maximum mass exceeding 3,500 kg with one or more successive axle lines, one or more of which consists of two single axles in line.

**Article 58 Pedal and brake forces**

The pedal forces and brake forces exerted during the determination of the brake deceleration are expressed in Newton (N).

### § 2. Roller brake tester

### § 2.1. Vehicles with a permissible maximum mass not exceeding 3,500 kg

**Article 59 Determination of the brake deceleration**

1. To determine the brake deceleration:

a. the maximum brake forces on the wheels of each axle must be determined including, if required, the corresponding pedal forces;

b. the brake forces of the front-most axle and rearmost axle or axle group must be added up and then divided by the mass in running order specified in the vehicle registration register. If the mass in running order is not specified in the vehicle registration register, 100 kg must be added to the unladen mass specified in the vehicle registration register. The result is multiplied by 10, and the result thereof is the “relative braking power”, expressed in percentage points;

c. the established values for the "relative braking power" and "pedal force" on the front-most axle, are used to assess the adequacy of the braking system based on Table 2 of this Article;
d. a road brake test must be performed if the corresponding values do not result in a direct decision.

2. If available, a suitable brake deceleration meter is used for the test described in subsection d of the first paragraph. The brake deceleration and the corresponding pedal force are assessed immediately before one or more of the vehicle's wheels block.
3. Vehicles taken into use prior to 01 July 1967 to which Table 2 is not applicable must comply with the brake deceleration specified for the vehicle.

Table 2

| | BRAKE TEST ON A ROLLER BRAKE TESTER | | | | |
|---|---|---|---|---|---|
| | BRAKING POWER IS SATISFACTORY | | BRAKING POWER IS UNSATISFACTORY | | FURTHER TESTING |
| | relative braking power | pedal force on the front-most axle | relative braking power | pedal force on the front-most axle | road brake test if the values do not result in a direct decision |
| Passenger cars, taken into use after 30-06-1967 and prior to 1-1-2012 | ** ≥ 40% and | ** ≤ 400 N | < 52% and | > 500 N | yes |
| | ≥ 52% and | ≤ 500 N | | | |
| Passenger cars, taken into use after 31-12-2011 | ** ≥ 45% and | ** ≤ 400 N | < 58% and | > 500 N | yes |
| | ≥ 58% and | ≤ 500 N | | | |
| Commercial vehicles*, taken into use after 30-06-1967 and prior to 1-1-1998 | ≥ 40% and | ≤ 700 N | < 40% and | > 700 N | yes |
| Commercial vehicles*, taken into use after 31-12-1997 and prior to 1-1-2012 | ≥ 45% and | ≤ 700 N | < 45% and | > 700 N | yes |
| Commercial vehicles*, taken into use after 31-12-2011 | ≥ 50% and | ≤ 700 N | < 50% and | > 700 N | yes |
| Buses*, taken into use after 30-06-1967 and prior to 1-1-2012 | ≥ 45% and | ≤ 700 N | < 45% and | > 700 N | yes |
| Buses*, taken into use after 31-12-2011 | ≥ 50% and | ≤ 700 N | < 50% and | > 700 N | yes |

* Permissible maximum mass ≤ 3,500 kg
** If one or both wheels of the front-most axle of the vehicle block(s) PREMATURELY or the roller brake tester shuts off.
(≥ means: greater than or equal to) (≤ means: smaller or equal to)

**Article 60 Determination of the brake forces of the service brake**

1. To determine the maximum brake forces referred to in Article 59 (a), the following applies:
   a. the pedal force used on the front-most axle does not need to be the same as that of the rearmost axle or the rearmost axle group;
   b. during the brake test, the brake pedal is slowly depressed and held at the time of reading;
   c. the maximum brake force is reached when:
   1°. a pedal force of 500 N is applied in the case of a passenger car taken into use after 30 June 1967;
   2°. a pedal force of 700 N is applied in the case of a commercial vehicle or bus taken into use after 30 June 1967;
   3°. one or more wheels of the vehicle block, or
   4°. the roller brake tester shuts off.
2. If the brake force on one wheel fluctuates between two values, or the brake force on both wheels fluctuates between two values, the minimum and maximum brake force per wheel are averaged, and this average is used as the brake force for that wheel.

**Article 61 Assessment of the difference in the brake forces of the service brake**
The difference in brake forces between the wheels on one axle may not exceed 30% of the highest measured brake force (upper limit) whereby the wheels do not block.

**Article 63 Determination of the brake deceleration of the parking brake**
In order to determine the brake deceleration of the parking brake, the brake force achieved during the brake test of the wheels must be divided by the vehicle's mass in running order as specified in the vehicle registration register. If the mass in running order is not specified in the vehicle registration register, 100 kg must be added to the unladen mass specified in the vehicle registration register.

**§ 2.2. Vehicles with a permissible maximum mass exceeding 3,500 kg, except for trailers with electrically assisted brakes**

**Article 64 Use of the roller brake tester**
1. The test is performed according to the procedure described in the instruction manual of the roller brake tester.
2. The result of the brake test is presented on a printout of the roll brake tester and based on the presented data it will be determined whether the vehicle complies with the statutory brake deceleration.
3. If the test cannot be performed according to the procedure described in the instruction manual of the roller brake tester, the brake deceleration will be determined by:
   a. determining the maximum brake forces per axle, and
   b. by adding up the total brake forces and then dividing the sum by the mass of the vehicle in running order specified in the vehicle registration register. If the mass in running order is not specified in the vehicle registration register, 100 kg must be added to the unladen mass specified in the vehicle registration register for the passenger car or commercial vehicle while the unladen mass specified in the vehicle registration register of a trailer will be applied or, contrary to the periodic inspection for the purpose of issuing an inspection report, the measured mass of the trailer or the load under the axles of the semi-trailer.

**Article 65 Extrapolation pressure of service brake on commercial vehicles, buses and trailers**
1. The extrapolation pressure for commercial vehicles and buses is fixed at 7.0 bar, unless documentation from the manufacturer or the information on the ALR / ABS EBS board shows that this pressure is higher. The extrapolation pressure for that axle is equal to the higher pressure.
2. The extrapolation pressure for trailers taken into use prior to 1 January 2012 is set at 6.5 bar. The extrapolation pressure for trailers taken into use after 31 December 2011 is set at 7.0 bar. If it concerns a trailer with a single brake line system, the extrapolation pressure is set at 4.5 bar.

**Article 66 Determination of the brake force of the service brake**
For the determination of the maximum brake forces, the following must be taken into account:
a. the pedal force and braking pressure do not necessarily need to be the same for all axles;
b. during the brake test, the brake pedal must be depressed slowly, and must be held steady for a while immediately before the blocking threshold is reached. The instructions of the brake test system must be observed;
c. the maximum brake force is reached when:
   1°. a pedal force of 700 N is applied or the maximum brake cylinder pressure is reached;
   2°. one or more wheels of the vehicle block, or
   3°. the roller brake tester shuts off.

**Article 67 Assessment of the difference in the brake forces of the service brake**
For the assessment of the difference in brake forces on a roller brake tester, the difference in brake forces between the wheels on one axle may not exceed 30% of the highest measured brake force (upper limit) whereby the wheels do not block.

**Article 68 Determination of the brake deceleration of the parking brake**
In order to determine the brake deceleration of the parking brake, the brake force achieved during the brake test of the wheels must be divided by the vehicle's mass in running order as specified in the vehicle registration register. If the mass in running order is not specified in the vehicle registration register, 100 kg must be added to the unladen mass specified in the vehicle registration register of the passenger car or commercial vehicle.

**§ 2.3. Vehicles with a permissible maximum mass exceeding 3,500 kg, with the aid of reference brake forces**

**Article 69 Reference brake force**
The reference brake force is the brake force of an axle that is developed on the circumference of the tyre on a roller brake tester in relation to the brake cylinder pressure and is announced at the time of approval. The reference brake forces for vehicles with air brakes are indicated by the vehicle manufacturer in such a way that the vehicle is able to achieve a brake deceleration equal to 5.0 m/s² in the case of motor vehicles and trailers, and 4.5 m/s² in the case of semi-trailers regardless of the loading condition, if the measured brake force on the roller brake tester at a given brake cylinder pressure is greater than or equal to the reference brake forces.

**Article 70 Determination of the brake deceleration of the service brake**
1. The reference values are determined by the pressure in the air pressure brake cylinders specified by the manufacturer, which is as close as possible to the pressure in the air pressure brake cylinder at the instant of slipping, but at least at a pressure of 2.5 bar.
2. If the reference brake forces are determined by the manufacturer at a brake deceleration of 5.0 m/s², the reference brake forces are, if applicable, recalculated by a factor of 4.5/5.0. If the reference brake forces, if applicable, for a semi-trailer, are determined at a brake deceleration of 4.5 m/s², the reference brake forces are recalculated by a factor of 4.0/4.5.
3. The measuring conditions and tolerances provided by the manufacturer must be taken into account whereby specific data are compared should this be necessary.

**Article 71 Assessment of the difference in the brake forces of the service brake**
If the braking power is determined by using reference brake forces, the difference in braking power between the wheels on one axle may not exceed 30% of the highest measured brake force, as determined in accordance with the first paragraph of Article 70.

**Article 72 Determination of the brake deceleration of the parking brake**
In order to determine the brake deceleration of the parking brake, the brake force achieved during the brake test of the wheels must be divided by the vehicle's mass in running order as specified in the vehicle registration register. If the mass in running order is not specified in the vehicle registration register, 100 kg must be added to the unladen mass specified in the vehicle registration register of the passenger car or commercial vehicle, while for a trailer, the unladen mass specified in the vehicle registration register will be applied.

**§ 2.4. Trailers with electrically assisted brakes with a permissible maximum mass exceeding 3,500 kg**

**Article 73 Determination of the brake deceleration of the service brake**
If the inspection of the brake deceleration of the service brake of trailers with a permissible maximum mass exceeding 3,500 kg is performed on a roller brake tester whereby the loading of the vehicle is simulated with securing straps or chains:
a. the maximum brake forces on the wheels must be determined after the simulated loading has been applied;
b. the brake deceleration achieved during the brake test must be calculated by adding up the brake forces and then dividing the sum by the permissible maximum mass under the axles specified in the vehicle registration register.

**Article 74 Determination of the brake force of the service brake**

1. For the determination of the maximum brake forces referred to in Article 73, the following must be taken into account:
   a. during the brake test, the braking power must be slowly increased by activating the brake module (EBC) and held steady at the instant of reading the result;
   b. the maximum brake force is reached when:
   1°. one or more wheels of the vehicle block, or
   2°. the roller brake tester shuts off.
2. If the wheels do not block or the roller brake tester does not shut off at maximum brake force, the brake forces read at that time shall be considered the maximum brake forces.
3. If the brake force on one wheel fluctuates between two values, or the brake force on both wheels on an axle fluctuates between two values, the minimum and maximum brake force per wheel must be averaged, and this average will be used as the brake force for that wheel.

**Article 75 Maximum brake forces of the service brake:**

If the inspection of the brake deceleration of the service brake of trailers with a permissible maximum mass exceeding 3,500 kg is performed on a roller brake tester without the loading of the vehicle being simulated, the maximum brake forces on the wheels must be determined for each axle.

**Article 76 Formulas for the determination of the brake deceleration of the service brake**

1. The following meanings apply when using the formula:
   $a_{vol}$ = calculated relative brake deceleration;
   $F_{b(n)}$ = sum of the brake forces on the wheels per axle 'n';
   $m_{max}$ = maximum mass under the axles;
2. For a trailer with a permissible maximum mass exceeding 3,500 kg, the brake deceleration of the service brake must be determined using the following formula:

$$a_{vol} = \frac{F_{b1} + F_{b2} + enz.}{m_{\max}}$$

**§ 3. Plate brake tester**

**§ 3.1. Passenger cars, commercial vehicles or buses with a permissible maximum mass not exceeding 3,500 kg**

**Article 77 Determination of the brake deceleration**

To determine the brake deceleration:

a. a pedal force meter must be used on which the pedal force applied can be read at the end of the brake test by means of the stop function;
b. the speed when starting the brake test must be approximately 10 km/h;
c. the brake force immediately before one or more of the vehicle's wheels block must be determined;
d. the brake test must be performed twice on each axle. If the brake forces achieved with these tests on the wheels per axle are virtually equal, thereby taking account of the pedal force applied, they will be used to determine the brake deceleration. If the brake forces achieved with these tests on the wheels per axle are not virtually equal, a third brake test must be performed for each axle. The brake forces achieved on the wheels of this last test, and those of the previous test that most closely approached these brake forces will be used to determine the brake deceleration;
e. the brake forces per axle obtained from the two brake tests must be added up and then divided by the mass in running order specified in the vehicle registration register and multiplied by two. If the mass in running order is not specified in the vehicle registration register, 100 kg km must be added to the unladen mass specified in the vehicle registration register and then multiplied by two.

**Article 78 Determination of the difference in braking power of the service brake**
In order to determine the difference in braking power between the wheels on one axle:
a. the results of the brake tests performed to determine the brake deceleration of the service brake may be used;
b. the assessment of the results must be based on Table 3 of this Article, in which the stated percentages are related to the highest measured brake force.

| | **Results of two normative brake tests DIFFERENCE BETWEEN LEFT AND RIGHT** | **Additional brake test on the plate brake tester required** | **Brake test result** | **CONCLUSION** |
|---|---|---|---|---|
| Difference on one axle | Difference between both tests < 30% | ----- | ----- | PERMITTED |
| | Difference between one test < 30% other test > 30% | yes | Difference in test > 30% | NOT PERMITTED |
| | | | Difference in test < 30% | PERMITTED |
| | Difference between both tests > 30% | ----- | ----- | NOT PERMITTED |

Table 3. Difference between left and right braking power on a plate brake tester.

**Article 81 Determination of the brake deceleration of the parking brake**
To determine the brake deceleration of the parking brake:
a. the speed when starting the brake test must be approximately 10 km/h;
b. the vehicle must come to a complete or near standstill at the end of the brake test;
c. the brake forces achieved during the brake test of the wheels must be divided by the vehicle's mass in running order as specified in the vehicle registration register. If the mass in running order is not specified in the vehicle registration register, 100 kg km must be added to the unladen mass specified in the vehicle registration register.

**§ 4. Electronic self-registering decelerometer**

**§ 4.1. Passenger cars, commercial vehicles or buses**

**Article 82 Pedal force of the service brake**
To determine the brake deceleration by means of a road test, the force exerted on the brake pedal must be kept virtually constant. The highest achievable brake deceleration is determined when slightly less pressure is applied, or slightly less pedal force is applied than necessary to reach the blocking limit of one or more wheels of the vehicle.

**Article 83 Determination of the brake deceleration**
The brake deceleration is determined as follows with the aid of an electronic self-registering decelerometer:
a. if the decelerometer indicates a resulting or average value, this value shall be deemed to be the minimum brake deceleration achieved;
b. if the brake deceleration cannot be determined in accordance with subsection a, the value determined using the measurement table on the record chart will apply by taking the average of all the measured brake decelerations that are equal to or greater than the minimum required brake deceleration and have been measured for at least half a second;

c. if the brake deceleration cannot be determined in accordance with subsections a or b, the brake deceleration will be determined using the graph on the record chart as follows:
   1°. if no sudden increase in the brake deceleration is observed at the moment the vehicle had practically reached a standstill, the highest brake deceleration value achieved will be decisive;
   2°. if a sudden increase in the brake deceleration is observed at the moment the vehicle had practically reached a standstill, the brake deceleration achieved just before this increase will be decisive.

**Article 84 Determining vehicle drift due to the application of the service brake**
To determine vehicle drift during a road test:
a. a passenger car must be braked up to the highest possible brake deceleration, with a maximum of 8 m/s²;
b. a commercial vehicle or bus must be braked up to the minimum required brake deceleration as specified for this vehicle category in Chapter 5 of these regulations;
c. the use of a decelerometer is not required.

**Article 85 Determination of the brake deceleration of the parking brake**
The brake deceleration of the parking brake of a passenger car, commercial vehicle or bus with a permissible maximum mass not exceeding 3,500 kg is determined with the aid of a self-registering decelerometer. The vehicle must come to a complete or near standstill at the end of the brake test.

**§ 4.2. Trailers with a permissible maximum mass exceeding 3,500 kg**

**Article 86 Conditions for testing the service brake**
1. The service brake of the trailer must be adjustable, and its operation must be independent of the towing vehicle. This is achieved by means of the stretch brake which can transmit the total pressure of the service brake, or with the aid of a system that allows the combination of vehicles to be braked from the towing vehicle by means of the service brake of the trailer, whereby the functioning of the service brake of the combination of vehicles may not be affected.
2. The weight ratio between the towing motor vehicle and the trailer may not be extremely large.

**Article 87 Determination of the brake deceleration of the service brake**
For the determination of the brake deceleration, the following must be taken into account:
a. the pressure introduced by means of the stretch brake or the system referred to in Article 86, first paragraph, must be increased to the blocking limit of one or more wheels, after which the brake deceleration is recorded at a slightly lower pressure;
b. if the decelerometer indicates a resulting or average value, this value shall be deemed to be the average brake deceleration of the combination;
c. if the brake deceleration cannot be determined in accordance with subsection b, the value determined using the measurement table on the record chart will apply by taking the average of all the measured brake decelerations that have been measured for at least half a second;
d. if the brake deceleration cannot be determined in accordance with subsections b or c, the brake deceleration will be determined using the graph on the record chart as follows:
   1°. if no sudden increase in the brake deceleration is observed at the moment the vehicle had practically reached a standstill, the highest brake deceleration value achieved will be decisive;
   2°. if a sudden increase in the brake deceleration is observed at the moment the vehicle had practically reached a standstill, the brake deceleration achieved just before this increase will be decisive.

**Article 88 Formula for the determination of the brake deceleration of the service brake**
The brake deceleration of the service brake must be determined using the following formula:

$$a_{ahw} = a \times \frac{m_{tot.geremd}}{m_{ahw}}$$

The following meanings apply when using the formula:
$a_{ahw}$ = brake deceleration of the trailer;
a = the average brake deceleration of the combination;
$m_{tot.geremd}$ = the total mass in running order of the towing and towed vehicle specified in the vehicle registration register of the combination that is braked by the trailer. If the mass in running order is not specified in the vehicle registration register of the towing and towed vehicle, 100 kg must be added to the unladen mass specified in the vehicle registration register for a commercial vehicle while the unladen mass specified in the vehicle registration register for a trailer will be applied or, contrary to the periodic inspection for the purpose of issuing an inspection report, the total measured mass of the combination that is braked by the trailer;
$m_{ahw}$ = the mass in running order of the trailer specified in the vehicle registration register. If the mass in running order is not specified in the vehicle registration register, the unladen mass specified in the vehicle registration register for the vehicle must be used for the calculation or, contrary to the periodic inspection for the purpose of issuing an inspection report, the measured mass of the trailer or the load under the axles of the semi-trailer.

**Title 8. Body**

**Section 1. Windscreens**

**§ 1. Vehicles with a permissible maximum mass not exceeding 3,500 kg**

**Article 91**
The windscreens of passenger cars, commercial vehicles or buses with a permissible maximum mass not exceeding 3,500 kg, and three-wheeled motor vehicles, may not have more damage or discolouration in the areas specified in Article 92 than that stipulated in Articles 93 and 94.

**Article 92**
1. The windscreen is divided into the following three imaginary areas, as shown in figure 18:
   a. the area immediately in front of the driver's field of vision: this is the part of the windscreen situated in front of the driver's seat, the size of an area projected on the windscreen with a horizontal side of 0.30 m and a vertical side of 0.20 m;
   b. the area in front of the driver's indirect field of vision, which is formed as follows: the direct field of vision is mirrored with respect to the centre of the windscreen to the right-hand side of the windscreen. The resulting area and the space to the direct field of vision form the indirect field of vision;
   c. the periphery: this is the remaining part of the windscreen.
2. The centre point of the area projected in paragraph 1, under a, must coincide with the intersection of:
   a. the imaginary vertical line on the windscreen from the driver's seating position through the centre of the steering wheel, and
   b. the path described by the centre point of the windscreen wiper blade on the windscreen, or in the case of a central windscreen wiper, the horizontal tangent to the defined described path, as shown in Figure 19.

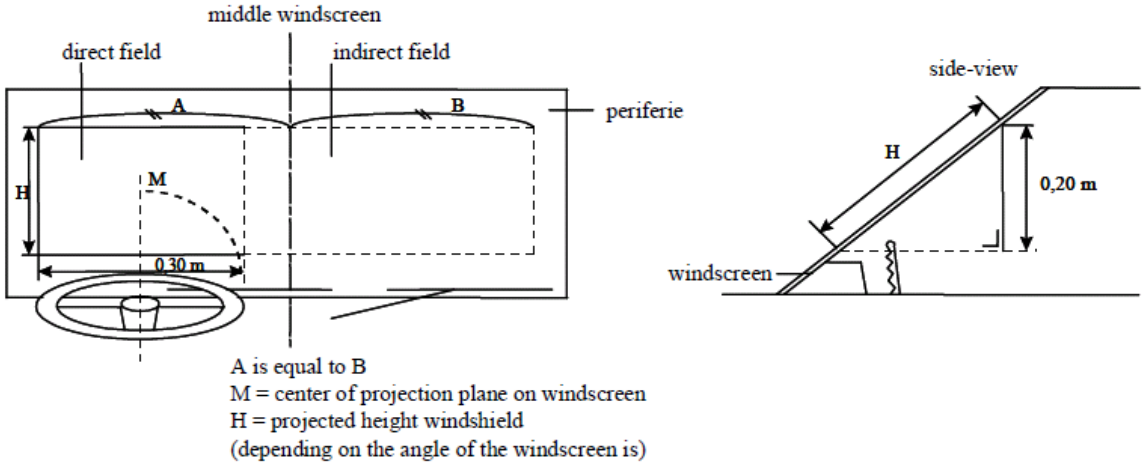



Figure 18 Windscreen

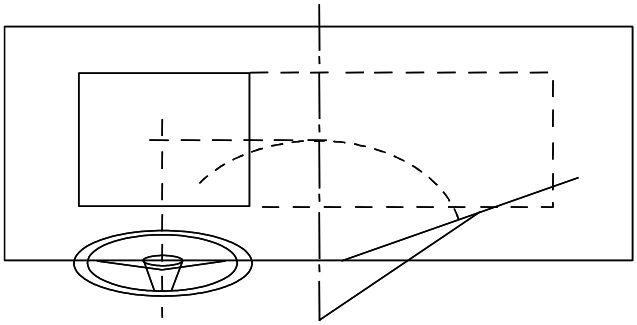


Figure 19. Central windscreen wiper

**Article 93**

1. The area in front of the direct field of vision may, in deviation from the requirements in Article 94, present the following damage or discolouration:
   a. single cracks, regardless of their length;
   b. superficial scratches with a width not exceeding 5 mm;
   c. damage or discolouration, the dimensions of which are such that an imaginary circle drawn around the entire damaged or discoloured area has a diameter not exceeding 20 mm.
2. The area in front of the indirect field of vision may, in deviation from the requirements in Article 94, present the following damage or discolouration:
   a. single cracks, regardless of their length;
   b. superficial scratches with a width not exceeding 5 mm;
   c. damage or discolouration, the dimensions of which are such that an imaginary circle drawn around the entire damaged or discoloured area has a diameter not exceeding 50 mm.
3. Single cracks, as referred to in the first two paragraphs, subsection a, are understood to mean cracks that do not show any branching between the starting and the end point in the fields of vision, as shown in figure 20.
4. Damage or discolouration may be present in the periphery.
5. If damage or discolouration extends into the various windscreen areas to be assessed, only the part of the damage or discolouration in the area being assessed should be considered.

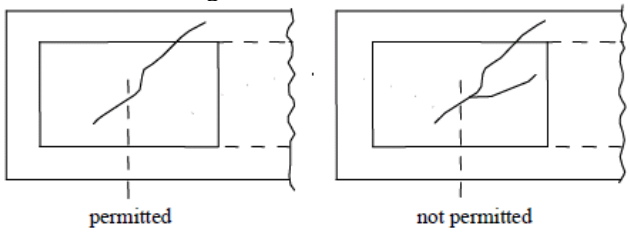



Figure 20. Permissible cracks

**Article 94**
The windscreen may exhibit multiple air bubbles, damage or discolouration that individually comply with the stipulations of Article 93 in respect of the dimensions, provided that they do not obstruct the driver's view.

**Article 95**
The requirements set out in this paragraph are assessed:
a. by means of a visual inspection;
b. by measuring with a measuring device of sufficient range in case of doubt.

**§ 2. Vehicles with a permissible maximum mass exceeding 3,500 kg**

**Article 96**
The windscreens of commercial vehicles or buses with a permissible maximum mass exceeding 3,500 kg may not have more damage or discolouration in the areas specified in Article 97 than that stipulated in Articles 98 and 99.

**Article 97**
1. The windscreen is divided into the following three imaginary areas:
   a. the area immediately in front of the driver's field of vision: this is the part of the windscreen situated in front of the driver's seat, the size of an area projected on the windscreen with a horizontal side of 0.40 m and a vertical side of 0.40 m, as shown in Figure 21;
   b. the area in front of the driver's indirect field of vision, which is formed as follows: the direct field of vision is mirrored with respect to the centre of the windscreen to the right-hand side of the windscreen: the resulting area and the space to the direct field of vision form the indirect field of vision;
   c. the periphery: this is the remaining part of the windscreen.
2. The centre point of the area projected in paragraph 1, under a, must coincide with the intersection of:
   a. the imaginary vertical line on the windscreen from the driver's seating position through the centre of the steering wheel, and
   b. the horizontal line at 0.65 m above the lowest point of the seat of the unoccupied driver's seat in the furthest-back and lowest position, assuming the most usual seating position for a driver of average height if the lowest position results to be lower than necessary for driving the vehicle.

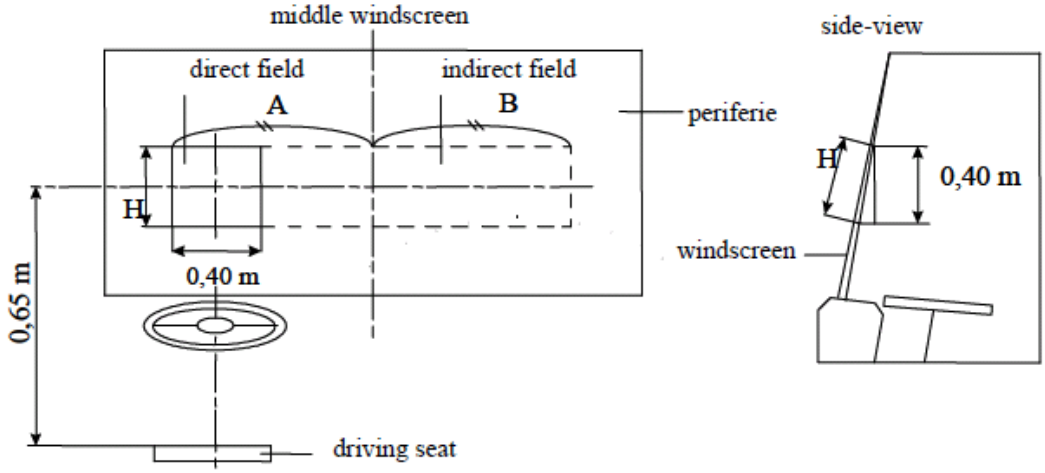



Figure 21. Windscreen

**Article 98**

1. The area in front of the direct field of vision may, in deviation from the requirements in Article 99, present the following damage or discolouration:
   a. single cracks, regardless of their length;
   b. superficial scratches with a width not exceeding 8 mm;
   c. damage or discolouration, the dimensions of which are such that an imaginary circle drawn around the entire damaged or discoloured area has a diameter not exceeding 30 mm.
2. The area in front of the indirect field of vision may, in deviation from the requirements in Article 99, present the following damage or discolouration:
   a. single cracks, regardless of their length;
   b. superficial scratches with a width not exceeding 8 mm;
   c. damage or discolouration, the dimensions of which are such that an imaginary circle drawn around the entire damaged or discoloured area has a diameter not exceeding 100 mm.
3. Single cracks, as referred to in the first two paragraphs, subsection a, are understood to mean cracks that do not show any branching between the starting and the end point in the fields of vision, as shown in figure 22.
4. Damage or discolouration may be present in the periphery.
5. If damage or discolouration extends into the various windscreen areas to be assessed, only the part of the damage or discolouration in the area being assessed should be considered.

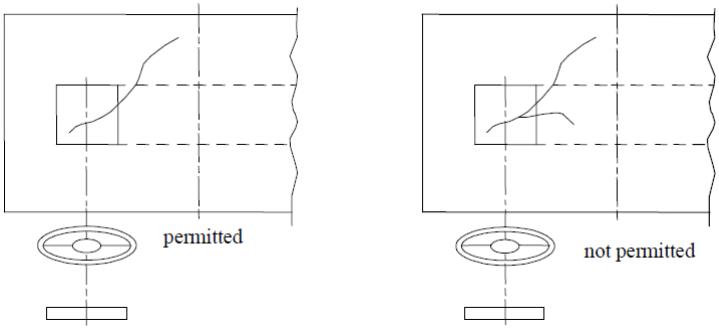



Figure 22. Permissible cracks

**Article 99**

The windscreen may exhibit multiple air bubbles, damage or discolouration that individually comply with the stipulations of Article 98 in respect of the dimensions, provided that they do not obstruct the driver's view.

**Article 100**

The requirements set out in this paragraph are assessed:

a. by means of a visual inspection;
b. by measuring with a measuring device of sufficient range in case of doubt.

**Section 3. Protection**

**§ 1. Wheel guards and spray suppression devices**

**Article 102**

1. The wheel guards of commercial vehicles and trailers with a permissible maximum mass of more than 3,500 kg, which were taken into use after 31 December 1974 must comply with the requirements in Articles 103 through 106.
2. The first paragraph is not applicable to semi-trailers, trailers with a rigid drawbar and centre-axle trailers with a permissible maximum mass exceeding 3,500 kg and of which the total sum of the axle loads does not exceed
   3,500 kg.

**Article 103**

The wheel guard must cover the entire horizontal projected area above each wheel. The wheels, including all fasteners and hubs, shall not protrude more than 30 mm beyond this guard in the width direction, as shown in

Figure 26.

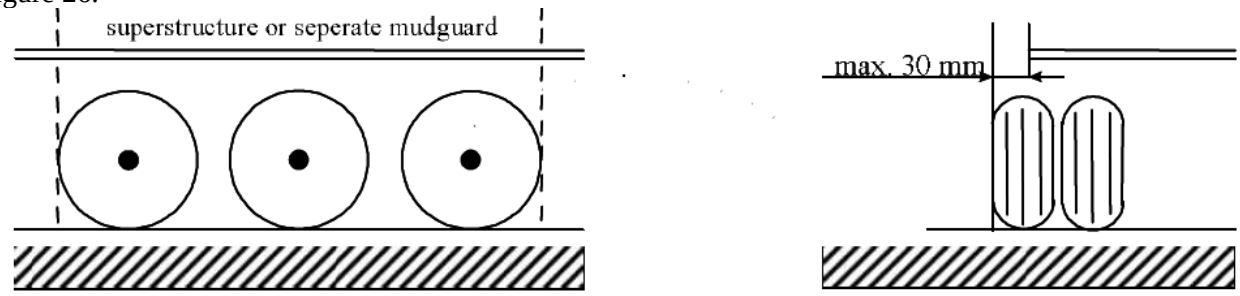



Figure 26. Projected area

**Article 104**

1. The wheels of the rearmost axle must have a wheel guard at the rear which may not extend above an imaginary horizontal plane located at 0.15 m above the centre of the wheels and at no more than 0.30 m behind the wheel. In addition, the rearmost part must at least extend to the imaginary line that forms an angle of 45° with the road surface, as shown in Figure 27.
2. If the rear wheels are steered or guided, the dimension of 0.30 m does not apply, as shown in Figure 27.

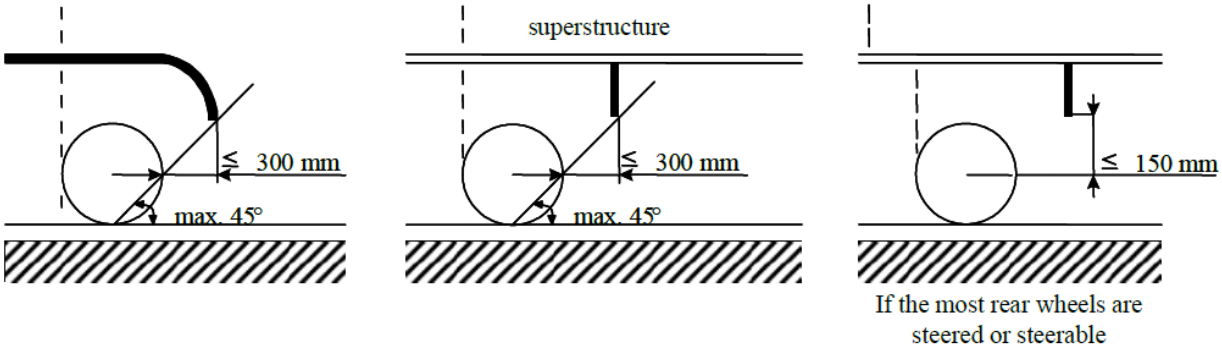



Figure 27. Extreme of the wheel guard

**Article 105**

1. The wheel guard must:
   a. be able to retain its shape, and
   b. be secured properly.
2. Notwithstanding subsection a of the first paragraph, a permanently fitted roll cloth is permitted for vehicles taken into use prior to 1 January 1995.
3. The requirements in the first paragraph are met if the wheel guard comprises a construction of hinged of sliding elements or is formed by a detachable cover.
4. A possible mudguard at the rear of the wheel is allowed as a wheel guard, provided that it is able to retain its shape or is sufficiently supported.

**Article 106**

Parts of the permanent superstructure may serve as part of the wheel guard.

**Article 106a**

1. Commercial vehicles, taken into use after 31 December 2016 with a permissible maximum mass exceeding 7,500 kg and trailers taken into use after 31 December 2016 and of which the total sum of the axle loads exceeds 3,500 kg, must be equipped with a sound spray suppression device that reduces the amount of water thrown up by the tyres and complies with the requirements set out in Articles 106b and 106c.
2. The first paragraph is not applicable to commercial vehicles that have the entry "G" in the vehicle registration register.

**Article 106b**

The spray suppression device must:

a. be fitted behind the wheels of the front axle or front axles and behind the wheels of the rearmost axle;
b. extend to a maximum of 30 cm above the road surface;
c. cover at least the entire width of the tread surface of the tyre, and
d. be secured properly.

**Article 106c**

Parts of the permanent superstructure may serve as part of the spray suppression device.

**§ 2. Lateral protection**

**Article 107**

1. The lateral protection of commercial vehicles and trailers with a permissible maximum mass of more than 3,500 kg which were taken into use after 31 December 1969, with the exception of centre-axle trailers, trailers with a rigid drawbar and dollies, must comply with the requirements in Articles 108 through 111.
2. The first paragraph is not applicable to semi-trailers with a permissible maximum mass exceeding 3,500 kg and of which the total sum of the axle loads does not exceed 3,500 kg.

**Article 108**

Commercial vehicles and trailers with a permissible maximum mass of more than 3,500 kg, which were taken into use after 31 December 1969 must be equipped with lateral protection on both sides. The following areas must be protected:

a. for commercial vehicles, the vertical surface which starts no more than 30 cm behind the cabin, or in the case of a steered or guided wheel, no more than 50 cm behind the rearmost front wheel, and ends 50 cm in front of the foremost rear wheel (see Figure 28),
b. for drawbar trailers, the vertical surface which starts no more than 50 cm behind the rearmost front wheel and ends 50 cm in front of the foremost rear wheel (see Figure 29),
c. for semi-trailers, the vertical surface which starts no more than 25 cm behind the centre of the trailer supports, with a maximum of 275 cm behind the centre line of the coupling pin, and ends 50 cm in front of the foremost rear wheel (see Figure 30).

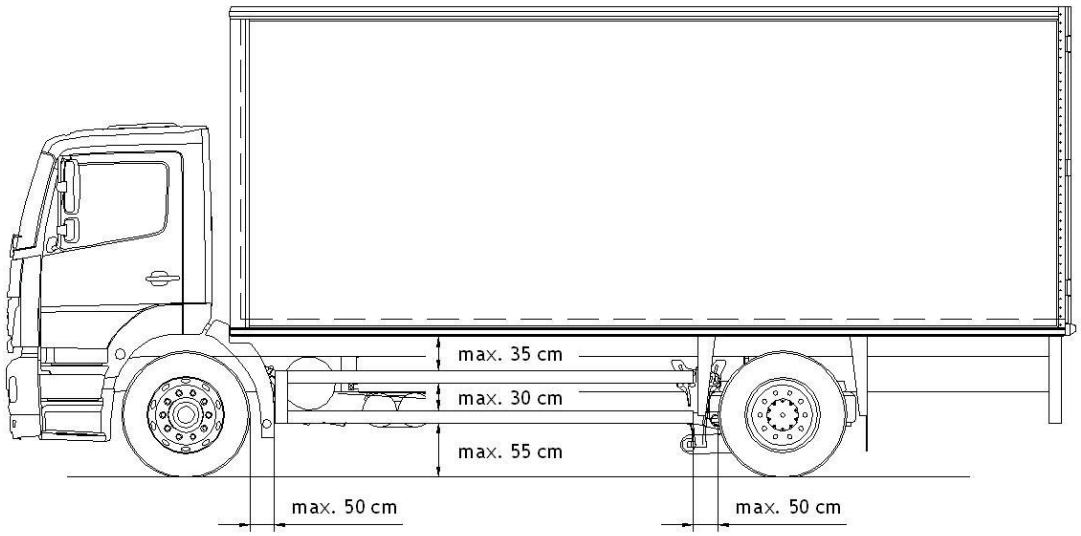



Figure 28. Lateral protection of a commercial vehicle

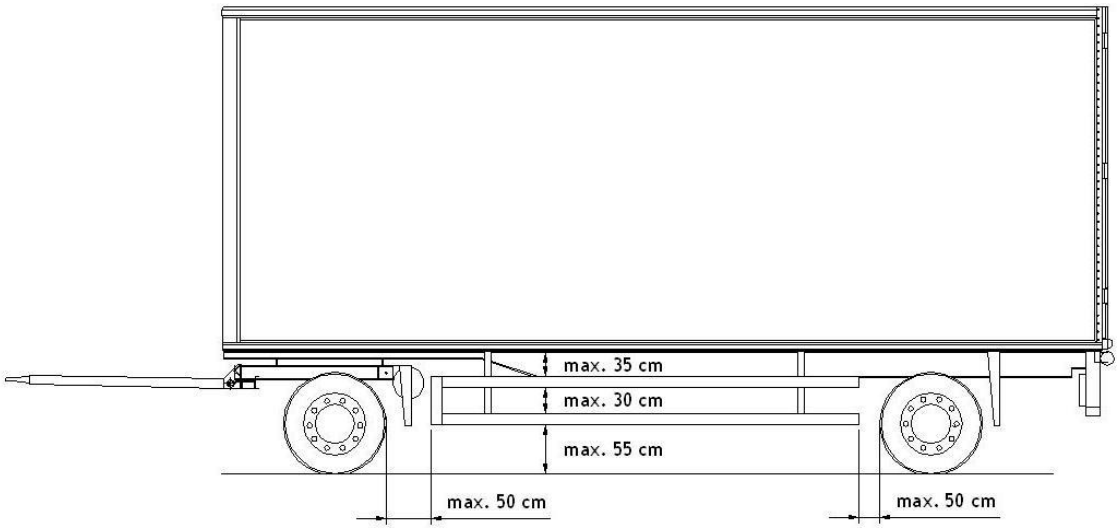



Figure 29. Lateral protection of a drawbar trailer

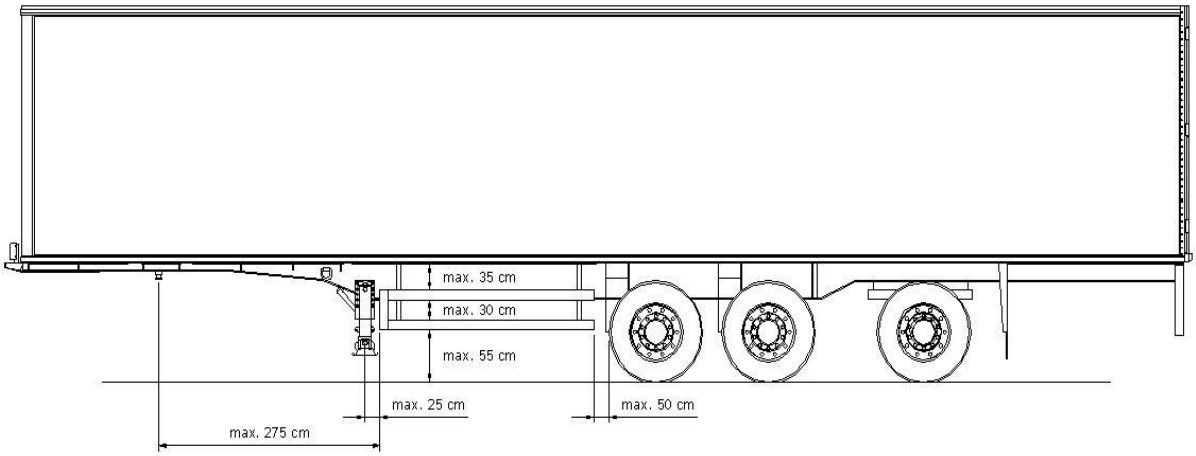



Figure 30. Lateral protection of a semi-trailer

**Article 109**

1. For commercial vehicles and trailers with a permissible maximum mass of more than 3,500 kg, which were taken into use after 31 December 1969 but prior to 1 January 1998, the lateral protection in the areas referred to in Article 108 must comply with the following requirements:
   a. the lower edge of the lateral protection may not be situated more than 130 cm above the road surface;
   b. the height of the horizontally mounted profiles must be at least 3 cm;
   c. the lateral protection may, among other parts, be formed by permanently present bodywork sections, edge sections, wheel guards, battery boxes, air or fuel reservoirs and tool chests, or from separately attached shape-retaining components;
   d. the lateral protection must be secured properly;
   e. in the longitudinal direction, the lateral protection may not be interrupted for more than 30 cm;
   f. the lateral protection must be present at a distance of no more than 15 cm inwards with respect to the widest point of the vehicle.
2. If the vehicle is extendable, subsection e of the first paragraph and Article 108 are not taken into account when the vehicle is extended.

**Article 110**

1. For commercial vehicles and trailers with a permissible maximum mass of more than 3,500 kg, which were taken into use after 31 December 1997, the lateral protection in the areas referred to in Article 108 must comply with the following requirements (see Figures 28, 29 and 30):
   a. the lateral protection must comprise one or more horizontally mounted profiles;
   b. the spacing between the profiles may not exceed 30 cm;
   c. the height of the profiles must be at least 5 cm;
   d. the lower edge of the lateral protection may not be situated more than 55 cm above the road surface;
   e. the upper edge of the lateral protection may not be situated more than 35 cm below the superstructure, or the upper edge must be situated 95 cm above the road surface. The top of the attachment points of an exchangeable body is considered to be the superstructure. The upper edge does not need to be situated higher than the top of the longitudinal members of the chassis or the loading floor;
   f. the lateral protection must be present at a distance of no more than 15 cm inwards with respect to the widest point of the vehicle.
   g. in the longitudinal direction, the lateral protection may not be interrupted for more than 5 cm;
   h. the lateral protection may, among other parts, be formed by permanently present bodywork sections, edge sections, wheel guards, battery boxes, air or fuel reservoirs and tool chests, or from separately attached shape-retaining components;
   i. the lateral protection must be secured properly;

2. If the vehicle is extendable, subsection g of the first paragraph and Article 108 are not taken into account when the vehicle is extended.
3. For a vehicle with extendable supports, the interruption of the lateral protection may not be greater than necessary for extending the supports.

**Article 111**
The requirements set out in this section are assessed:
a. by means of a visual inspection,
b. by measuring with a measuring device of sufficient range in case of doubt, thereby taking account of the following:
1 °. the vehicle is located on a horizontal or virtually horizontal and flat road surface,
2 °. all wheels are in the forward driving position,
3 °. the tyre pressure is correct,
c. by placing the vehicle, if it concerns a semi-trailer, on supports in such a manner that the loading floor is in a horizontal position or its position corresponds to the normal driving position.

**§ 3.Frontbeschermingsinrichting**

**Article 112**
1. The model of the EC type-approval mark for front under run protection systems must correspond to Figure 31 and must be fitted in a clearly legible and indelible manner.
2. The first paragraph is assessed by means of a visual inspection.

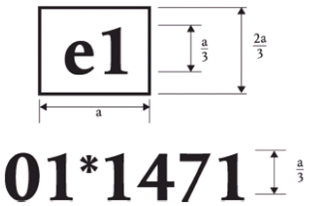


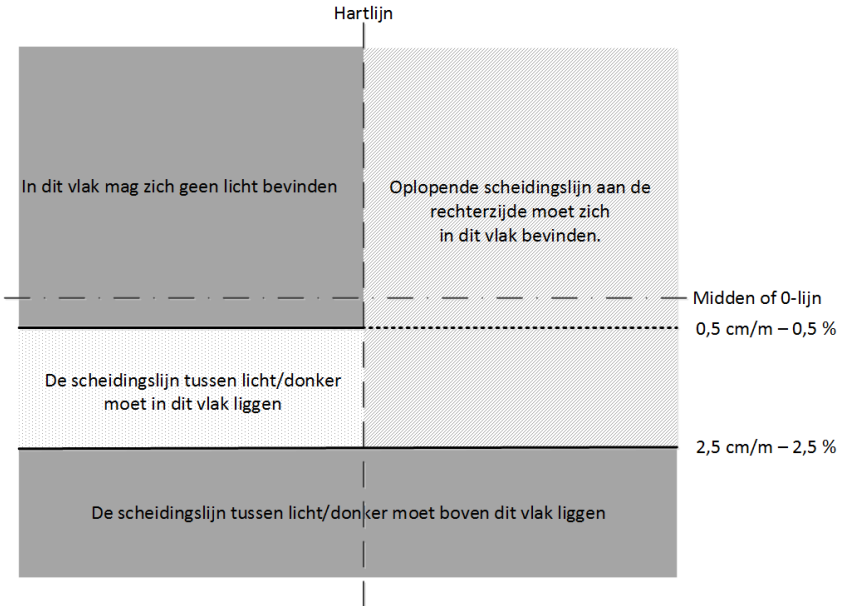

Figure 31. EC type-approval mark, in which the following codes have the corresponding meanings

e1: EC type-approval. The Member State that issued the approval is indicated with a variable identification letter (‘1’ is Germany, ‘4’ is the Netherlands);
01: variable serial number indicating the (amendment) directive according to which the EC type-approval took place. The serial number is followed by an asterisk or a space;
1471: variable basic approval number.

**Title 9. Lights and retro-reflective features**

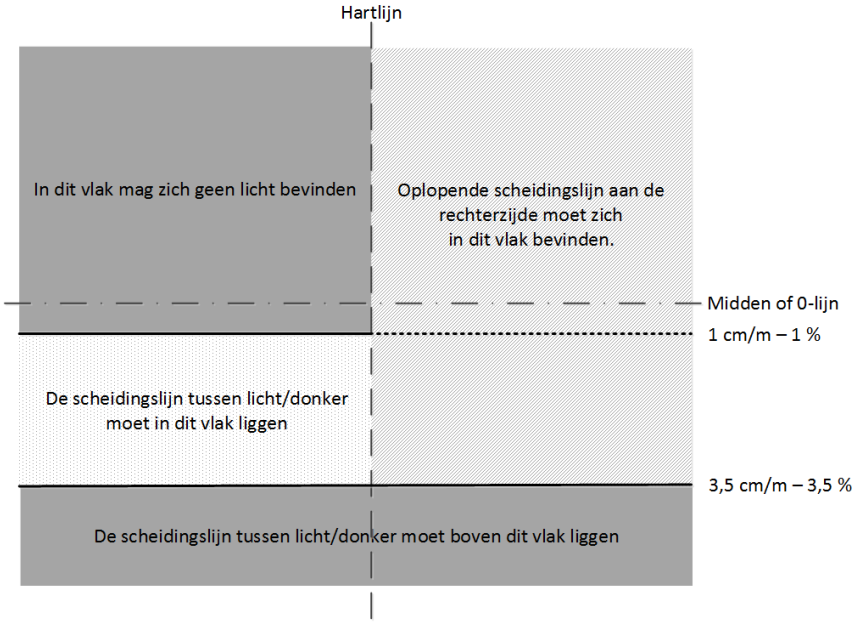
**Section 1. Dipped beam**

**Article 113**
1. The dipped-beam headlamp must be adjusted in such a way that during an inspection using a headlamp tester or a light screen, the projected image, after fixation of this device or screen, complies with the following requirements:
   a. the illuminated area must be situated below the dark area;
   b. a clear, wholly or partially horizontal dividing line must be visible between the light and the dark area;
   c. The downward inclination of the beam of the dipped beam lamp, of which the lower edge of the glass is less than or equal to 80 cm above the road surface, must correspond (see figure 31a) to:
      1°. Be at least 0.5 cm/m or 0.5% at 10 m, and
      2°. Be a maximum of 2.5 cm/m or 2.5% at 10 m.




Figuur 31a

d. The downward inclination of the beam of the dipped beam lamp, of which the lower edge of the glass is less than or equal to 80 cm above the road surface, must correspond (see figure 31b) to:
1°. Be at least 1 cm/m or 1% at 10 m, and
2°. Be a maximum of 3.5 cm/m or 3.5% at 10 m.




Figuur 31b

e. The light beam must largely be concentrated in the centre of the projection surface. For asymmetrical light beams, the rising line on the right side of the beam must be to the right of the vertical centreline of the projection plane.

2. Notwithstanding the first paragraph, the following applies to the dipped-beam headlamps of agricultural or forestry tractors:

a. the horizontal dividing line between the light and the dark area must be between 0,5 and 6 mm/m or 0,5% and 6% on 10 m;

b. if the dipped beam is situated at a height of more than 1.5 m above the road surface, the adjustment of the dipped-beam headlamp will be determined by performing a measurement. Thereby, the dipped-beam headlamp must be adjusted such that the horizontal dividing line between the light and the dark area, measured at 15 m from the dipped-beam headlamp, is situated at a height which is at least equal to half the distance between the ground and the centre of the light beam (see Figure 31a). If a partly horizontal dividing line is visible, the horizontal part of the dividing line must be mostly situated to the left of the vertical centre line.

The inspection of the adjustment must be performed with the aid of a suitable measuring device; the use of a headlamp tester is not required for this inspection. The vehicle is placed in front of a sufficiently large vertical surface at an angle of 90° with the ground on which the vehicle is located.

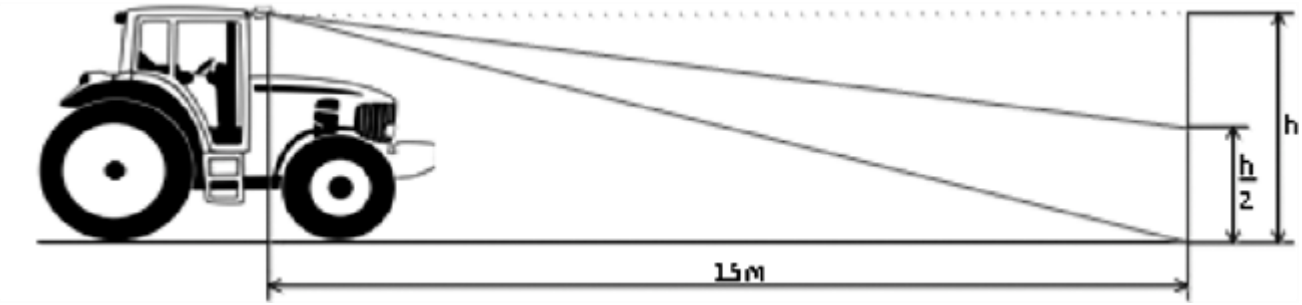



Figure 31c. Adjustment of the dipped-beam headlamp of agricultural or forestry tractors

**Article 114**

1. The direction of the light beam from the dipped-beam headlamps must be checked with the aid of a headlamp tester positioned in front of the vehicle, and whereby:

a. all wheels of the vehicle are in the forward driving position;

b. the handbrake of the vehicle is disengaged, and

c. the vehicle and the headlamp tester are on a flat and horizontal surface.

2. If the vehicle is equipped with a unit which allows for easy adjustment of the dipped beam setting to the load condition, this unit must be set to the position corresponding to the load condition during the inspection.

3. If the vehicle is equipped with an automatic level adjuster, the inspection must be performed with the engine running at idle. Any control unit must be in the normal driving position.

4. Vehicles provided with a number plate containing the letter groups CD or CDJ or the letter groups BN or GN and two groups of two digits, or an indication concerning aberrant headlamps in the vehicle registration register or on the registration certificate may be provided with dipped-beam headlamps with an aberrant beam. The dipped-beam headlamp is considered not to be glaring if it is set as follows:

a. overall, the brightest area projected, both for a laden or unladen vehicle, may not be situated above the horizontal line which corresponds to a declination of the light beam of 2 cm/m with respect to the centre of the headlamp;

b. in addition, the centre of this area may not be situated clearly to the left of the vertical centre line on the screen of the headlamp tester.

**Section 1a. Front fog lamp**

**Article 114a**
The front fog lamp must be adjusted in such a way that during an inspection using a headlamp tester or a light screen, the projected image, after fixation of this device or screen, the brightest area projected for both a laden or unladen vehicle, is not situated above the horizontal line which corresponds to the centre of the front fog lamp.

**Article 114b**
The direction of the light beam from the front fog lamp must be checked with the aid of a headlamp tester positioned in front of the vehicle, and whereby:
a. all wheels of the vehicle are in the forward driving position;
b. the handbrake of the vehicle is disengaged; and
c. the vehicle and the headlamp tester are on a flat and horizontal surface.

**Section 2. Gas discharge light sources**

**Article 115**
Gas discharge light sources are lamps supplied with a (much) higher voltage than the vehicle supply. It concerns a gas discharge light source in any case if:
a. the light output of the dipped-beam headlamps only reaches maximum strength some time after being switched on;
b. the dipped-beam headlamp's supply voltage is provided via a high voltage transformer, which may or may not be marked with the following symbol:

**Article 117**
For dipped-beam headlamps with gas discharge light sources, the gas discharge light sources must remain switched on when the headlamp is on.

**Section 3. Side marker lamps and retro reflectors**

**§ 1. Side marker lamps and amber retro-reflective features**

**Article 119**
Side marker lamps and amber retro reflectors must be fitted on each side of the vehicle.

**Article 120**
1. Side marker lamps and amber retro reflectors must be positioned as follows:
   a. if the vehicle length exceeds 6.00 m, at least one side marker lamp and one retro-reflector must be positioned in the central third part of the vehicle;
   b. the spacing between the side marker lamps and the spacing between the retro reflectors may not exceed 4.00 m;
   c. the distance from the front-most side marker lamp and from the front-most retro-reflector to the front-most part of the vehicle may not exceed 4.00 m;
   d. the distance from the rearmost side marker lamp and from the rearmost retro-reflector to the rearmost part of the vehicle may not exceed 1.00 m.
2. If the vehicle length does not exceed 6.00 m, or if it is denominated a bare chassis in the vehicle registration register, then, when dividing the length of the vehicle into three equal parts, one side marker lamp may be situated in the front third and one in the rear third of the length of the vehicle, in which the presence of a single side marker lamp is sufficient.

**Article 121**

Side marker lamps and amber retro reflectors must be installed at a height of no less than 0.25 m yet no more than 1.50 m above the road surface. If the construction of the vehicle impedes this, the side marker lamps may be installed at a height of between 1.50 m and 2.10 m above the road surface.

**Article 122**
The requirements set out in this paragraph are assessed:
a. by means of a visual inspection;
b. by measuring with a measuring device of sufficient range in case of doubt.

**Section 4. Damage and modifications**

**Article 128**
1. The glass of the lamp fittings may not have been sprayed, painted or covered.
2. The glass of the lamp fittings at the rear of the vehicle, except for the reversing lamps, may not exhibit cracks or holes through which white light is emitted rearward.

**Line and contour marking**

**Article 153**
1. Conspicuity markings are not required for vehicles used for the services referred to in Article 29, first paragraph of the Road Traffic and Traffic Signals Regulations 1990, which are allowed to bear the signals indicated there.
2. Instead of line marking, the vehicle may also have a full contour marking on the rear side of the vehicle.
3. Instead of line marking, the vehicle may also have a partial or full contour marking on the side of the vehicle.
4. In the event of partial contour marking, every top corner is marked by two perpendicular lines each with a length of at least 0.25 m. If the lines cannot be applied perpendicularly, the contour of the vehicle must be followed as far as possible.
5. The material of the conspicuity markings must meet the UN/ECE Regulation 104, Class C.
6. Line markings and the bottom elements of contour markings may not be mounted higher than 2.50 m.
7. Conspicuity markings must be considered continuous if the interruptions do not exceed 1.00 m.
8. A full contour marking on the side of the vehicle may contain retro-reflective numbers, letters or images of which the material complies with UN/ECE Regulation 104, Class D or E, on condition that these do not affect the effectiveness of the contour marking and the mandatory lights and retro-reflective features. In any case, the retro-reflective numbers, letters or images may not cover more than 1/3 of the total area within the circumference of the full contour marking.
9. The requirement referred to in the fifth and eighth paragraph is not assessed during the periodic inspection for the purpose of issuing an inspection report.

| **Annex 1 (corrosion) pertaining to Articles 5 through 7** | | |
|---|---|---|
| Motor vehicles without a full load-bearing frame: the degree of rust damage at maximum loss of function per part, per attachment of a part, or per section of the bottom plate. | | |
| **General construction method of the vehicle** | Degree of rust damage | assessment principle according to Section 1, Article |
| **Longitudinal or cross members** | | |
| | | |
| **Cross members** | | |
| Cross-bar behind rear wheel suspension with rear engine | 6E | 7 |
| Cross-bar in front of front wheel suspension | 6E | 7 |
| Main cross-bar | 6E | 7 |
| Supporting cross-bar | 4E | 7 |
| Beam to reinforce a plate section, not fixed to another beam or plate section | 1E | 7 |
| | | |
| **Longitudinal members** | | |
| Sill: the sill length comprises the underside of a door, or two doors if there is no intermediate post. If there is an intermediate post and the two doors do not adjoin completely, the part between the doors must be divided into two halves for the determination of the length. Each half is added to the length of either the first or the second sill. | 6E | 7 |
| | | |
| **End longitudinal member** | | |
| End longitudinal member: the length of the end longitudinal member is measured from the rear of the member to the beginning of the horizontal part of the bottom plate. | 8E | 7 |
| Attachment to bottom plate or loading floor | 8E | 12 |
| | | |
| **Front longitudinal member** | | |
| Front longitudinal member: the length of the front longitudinal member is measured from the front of the member to the beginning of the horizontal part of the bottom plate. | 8E | 7 |
| Attachment to bottom plate or bulkhead | 8E | 12 |
| Main longitudinal member | 6E | 7 |
| Supporting longitudinal member | 4E | 7 |
| | | |
| **Sub-frame** | | |
| Sub-frame front or rear | 6E | 7 |
| Attachment of each point of the sub-frame to the bodywork or beam | 6E | 12 |
| | | |
| Start and end pieces of a beam which falls outside the stipulated length by a maximum of 150 mm | 1E | 7 |
| Door pillar: the length as indicated in Figure 1 (page 53) | 6E | 7 |
| Window pillar: the length as indicated in Figure 1 (page 53) | 6E | 7 |

| **General construction method of the vehicle** | Degree of rust damage | assessment principle according to Section 1, Article |
|---|---|---|
| **Plate sections** | | |
| Bottom plate section | 8E | 8 and 9 |
| Door panel | 1E | 11 |
| Floor of the boot | 4E | 11 |
| Floor of the boot loaded by attachment of fuel tank or coupling device (tow bar) | 8E | 11 |
| Boot lid | 1E | 11 |
| Bonnet | 1E | 11 |
| Plate section to which light fittings are attached | 4E | 11 |
| Bulkhead | 4E | 11 |
| Buttress (reinforcement plate) between bulkhead or door pillar and the top of the wheel arch | 6E | 11 |
| Front-most or rearmost outer screen | 4E | 11 |
| | | |
| **Coil spring housing** | | |
| Coil spring housing attachment | 8E | 12 |
| | | |
| **Wheel arch** | | |
| Wheel arch | 8E | 10 |
| | | |
| **Wheel arch at the front wheel (partly) loaded by shock absorber or coil spring** | | |
| Top attachment | 6E | 10 |
| Attachment to bulkhead | 6E | 10 |
| Bottom attachment | 6E | 10 |
| | | |
| **Wheel arch at the rear wheel (partly) loaded by shock absorber or coil spring** | | |
| Attachment to outer screen | 4E | 10 |
| Attachment of the halves of the wheel arch | 6E | 10 |
| Attachment to bottom plate or the floor of the boot | 6E | 10 |
| | | |
| **Wheel arch at the rear wheel without shock absorber or coil spring attachment** | | |
| Attachment of the halves of the wheel arch | 4E | 10 |
| | | |
| **Engine** | | |
| Entire engine mounting | 8E | 12 |
| Entire fuel tank attachment to bodywork or chassis | 8E | 12 |
| | | |
| **Power transmission** | | |
| Attachment of each point of the transmission | 8E | 12 |
| | | |
| **Axles** | | |
| Attachment of the axle | 8E | 12 |
| Attachment of the torque arm or panhard rod | 8E | 12 |
| Attachment of the upper or lower wheel-drive element | 8E | 12 |

| **General construction method of the vehicle** | Degree of rust damage | assessment principle according to Section 1, Article |
|---|---|---|
| **Suspension** | | |
| Attachment of the shock absorber | 6E | 12 |
| Attachment of the spring | 8E | 12 |
| Attachment of the suspension bracket or spring shackle | 8E | 12 |
| | | |
| **Steering equipment** | | |
| Attachment of the secondary Pitman arm | 8E | 12 |
| Attachment of the steering box per bolt | 8E | 12 |
| Attachment of the other parts | 8E | 12 |
| | | |
| **Brake system** | | |
| Attachment of the master brake cylinder | 8E | 12 |
| Attachment of the brake pedal | 8E | 12 |
| | | |
| **Body** | | |
| Attachment of each point of the seat belt | 8E | 12 |
| Door locks and hinges | | |
| Attachment of the hinges or sliding door guides of each door | 6E | 12 |
| Attachment of the locks on each door | 6E | 12 |
| If the seatbelt is mounted to the door | | |
| Attachment of the hinges or sliding door guides of each door | 8E | 12 |
| Attachment of the locks on each door | 8E | 12 |
| Bonnet, boot lid or aerodynamic devices and equipment | | |
| Entire attachment of the hinges | 6E | 12 |
| Entire attachment of the locks | 6E | 12 |
| | | |
| **Seats** | | |
| Attachment of each point of the seat | 6E | 12 |
| If the seatbelt is mounted to the seat | | |
| Attachment of each point of the seat | 8E | 12 |
| | | |
| **Lamps** | | |
| Attachment of the light fittings | 4E | 12 |
| | | |
| **Coupling of motor vehicle and trailer** | | |
| Attachment of each point of the coupling device for a trailer | 8E | 12 |

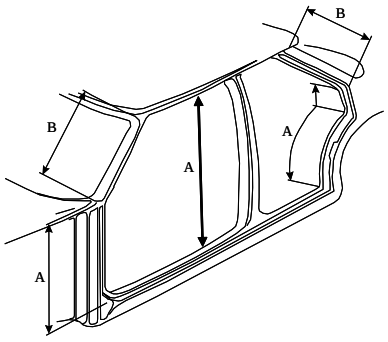
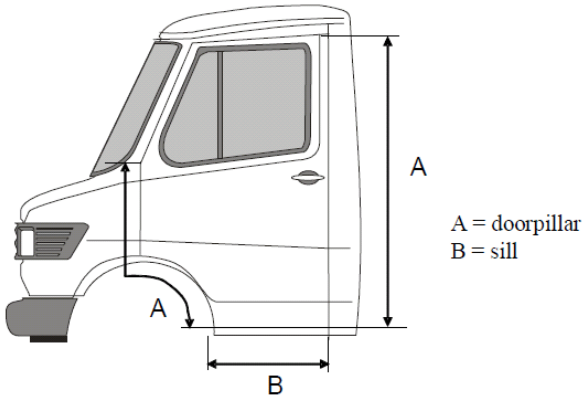



Figure 1
Length of door pillar and window pillar

| **Annex 2 (corrosion), pertaining to Article 15, Paragraph 1** | |
|---|---|
| Motor vehicles with a full load-bearing frame, regardless of their mass, as well as trailers with a permissible maximum mass exceeding 3,500 kg; longitudinal and cross members, axle attachments, profiles and towing devices of centre-axle trailers and trailers with a rigid drawbar. | |
| | |
| **Parts to be inspected** | Maximum permitted reduction in thickness of material compared to original thickness |
| All cross members | 30% |
| All longitudinal members | 20% |
| Axle attachments | 20% |
| All profiles that form part of the turntable bearing support, the semi-trailer coupling or the coupling plate | 20% |
| Towing devices of centre-axle trailers and trailers with a rigid drawbar | 20% |

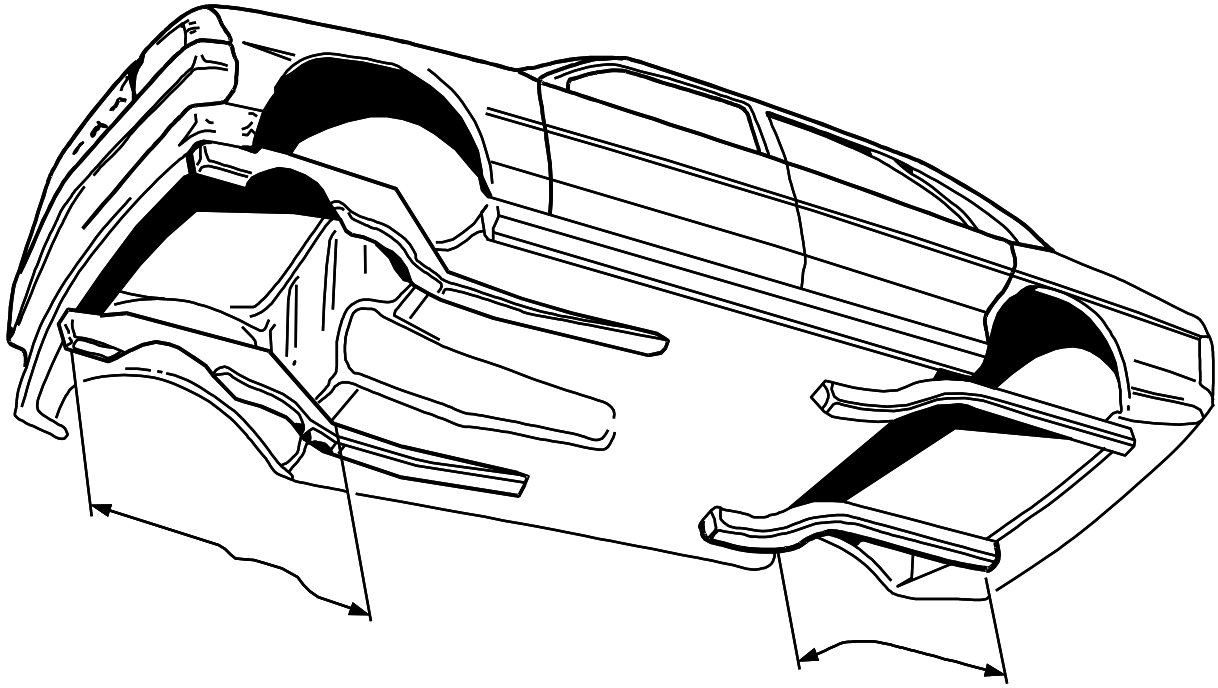
| **Annex 3 (corrosion) pertaining to Articles 17 through 19** | | |
|---|---|---|
| Parts of motor vehicles with a full load-bearing frame, regardless of their mass, as well as trailers with a permissible maximum mass exceeding 3,500 kg; the degree of rust damage at maximum loss of function per part or per attachment of a part. | | |
| | | |
| **General construction method of the vehicle** | Degree of rust damage | assessment principle according to Section 2, Article |
| Entire attachment of the passenger area and non-tilting cab to the chassis | 8E | 21 |
| **Tilt cab** | | |
| Entire attachment of the locking system | 6E | 21 |
| Entire attachment of the hinges | 6E | 21 |
| | | |
| Door pillar | 4E | 19 |
| Sill: the sill length is the length between the door pillars for each door opening. | 4E | 19 |
| Main longitudinal member | 6E | 19 |
| Main cross-bar | 6E | 19 |
| Supporting longitudinal member | 4E | 19 |
| Supporting cross-bar | 4E | 19 |
| Beam without supporting function, for the reinforcement of a plate section | 1E | 19 |



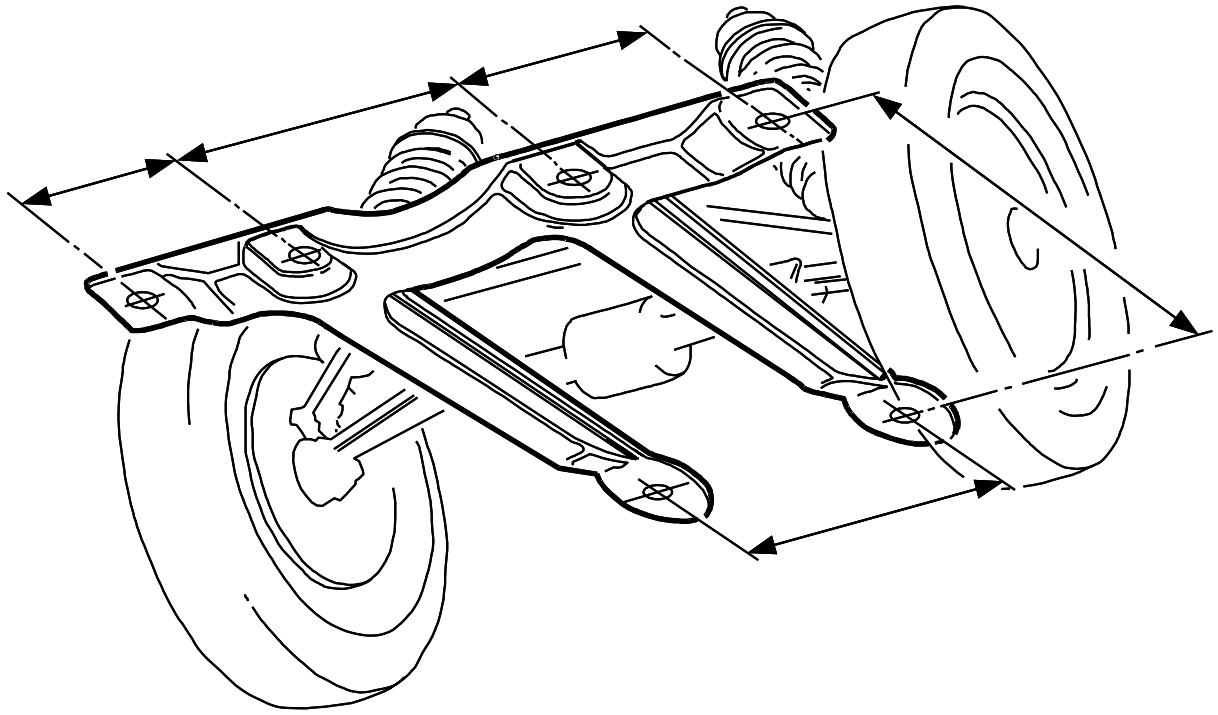

| **General construction method of the vehicle** | Degree of rust damage | assessment principle according to Section 2, Article |
|---|---|---|
| **Plate sections** | | |
| Bottom plate at the “footrest” | 4E | 20 |
| Door panel | 1E | 20 |
| Floor of the boot | 4E | 20 |
| Floor of the boot loaded by attachment of fuel tank or coupling device | 8E | 20 |
| Boot lid | 1E | 20 |
| Bonnet | 1E | 20 |
| Plate section to which light fittings are attached | 4E | 20 |
| Bulkhead | 2E | 20 |
| Front-most or rearmost outer screen | 2E | 20 |
| Wheel arch | 2E | 20 |
| | | |
| Window pillar | 4E | 19 |

| **General construction method of the vehicle** | Degree of rust damage | assessment principle according to Section 2, Article |
|---|---|---|
| **Engine** | | |
| Entire engine mounting | 8E | 21 |
| Entire fuel tank attachment to bodywork or chassis | 8E | 21 |
| | | |
| **Power transmission** | | |
| Attachment of each point of the transmission | 8E | 21 |
| | | |
| **Axles** | | |
| Attachment of the torque arm or panhard rod | 8E | 21 |
| Attachment of the upper or lower wheel-drive element | 8E | 21 |
| | | |
| **Suspension** | | |
| Attachment of the shock absorber | 6E | 21 |
| Attachment of the spring | 8E | 21 |
| Attachment of the suspension bracket or spring shackle | 8E | 21 |
| | | |
| **Steering equipment** | | |
| Attachment of the secondary Pitman arm | 8E | 21 |
| Attachment of the steering box per bolt | 8E | 21 |
| Attachment of the other parts | 8E | 21 |
| | | |
| **Brake system** | | |
| Attachment of the master brake cylinder | 8E | 21 |
| Attachment of the brake pedal | 8E | 21 |
| | | |
| **Body** | | |
| Attachment of each point of the seat belt | 8E | 21 |
| Door locks and hinges | | |
| Attachment of the hinges or sliding door guides of each door | 6E | 21 |
| Attachment of the locks on each door | 6E | 21 |
| If the seatbelt is mounted to the door: | | |
| Attachment of the hinges or sliding door guides of each door | 8E | |
| Attachment of the locks on each door | 8E | 21 |
| Bonnet, boot lid or aerodynamic devices and equipment | | |
| Entire attachment of the hinges | 6E | 21 |
| Entire attachment of the locks | 6E | 21 |
| Seats | | |
| Attachment of each point of the seat | 6E | 21 |
| If the seatbelt is mounted to the seat: | | |
| Attachment of each point of the seat | 8E | 21 |
| | | |
| **Lamps** | | |
| Attachment of the light fittings | 4E | 21 |
| | | |
| **Coupling of motor vehicle and trailer** | | |
| Attachment of each point of the coupling device for a trailer | 8E | 21 |

**Examples of application of rust standard**

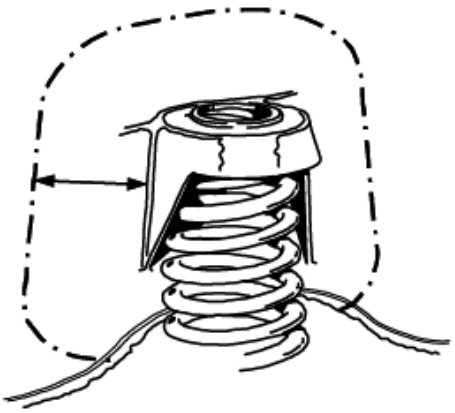


Determination of the length of the front longitudinal and end longitudinal beams

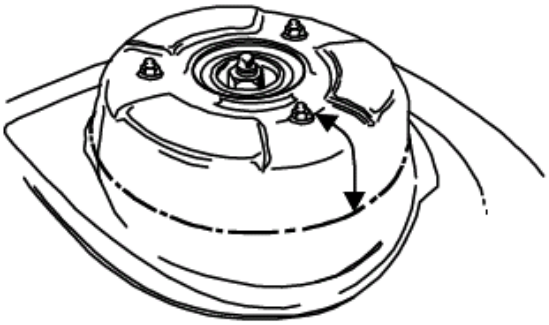


Determination of the length of the beams of a sub-frame

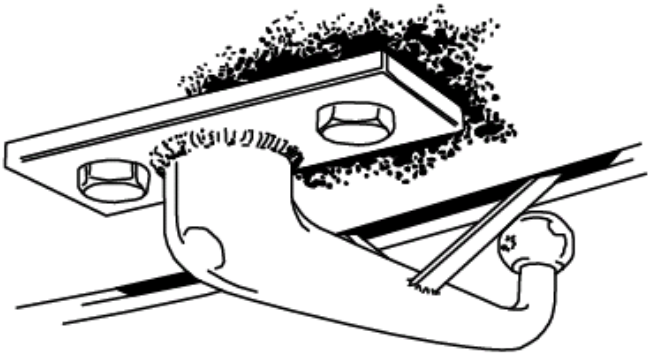
**Anchoring**



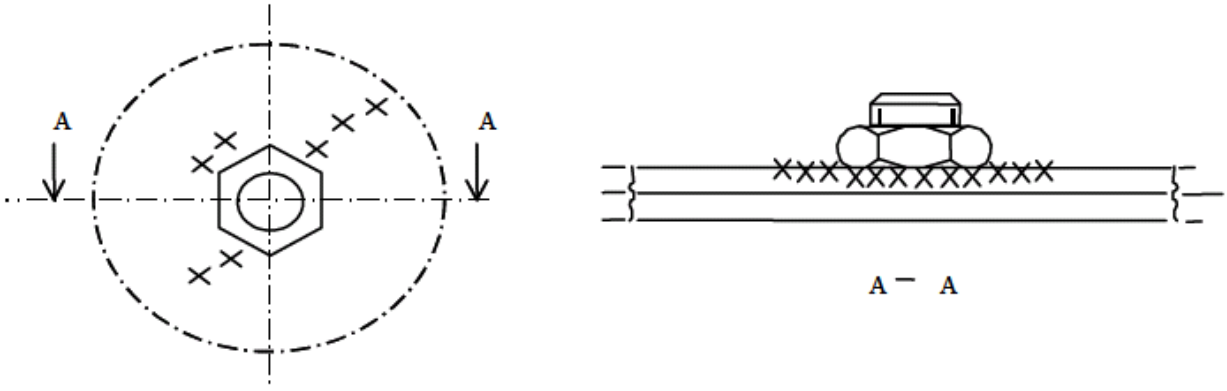
Imaginary line 100 mm around spring anchoring



Imaginary line 100 mm around springarm anchoring

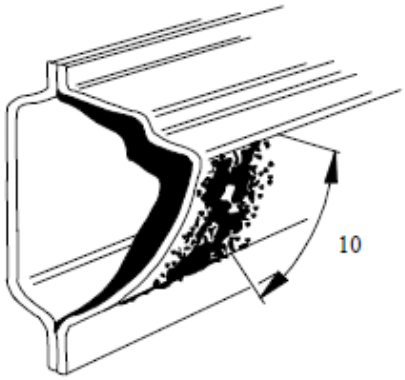


Sample decreased strength of a coupling material around one bolt rust away to collect rust damage 50%

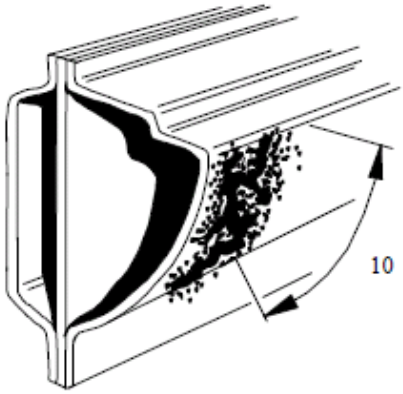



Sample decreased strength double top plate circa 80% rusted bottom plate still intact size rust damage 40%

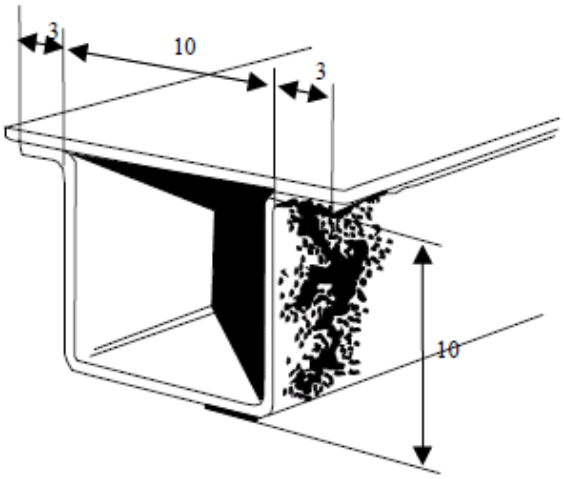
**Beams**



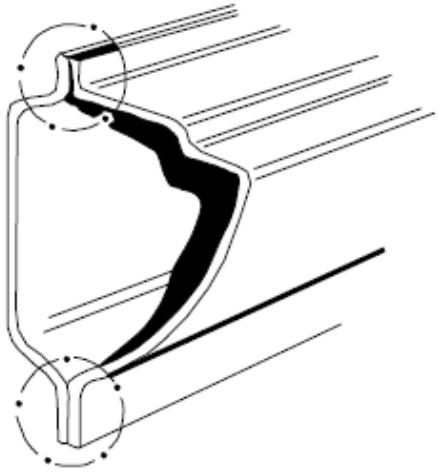

Sample size calculation rust damage
Total length of the transverse cross: 34 cm
Damaged section: 10 cm
Calculation: 10/34 x 100% = 30%




Sample size calculation rust damage
Total length of the transverse cross: 48 cm
Damaged section: 10 cm
Calculation: 10/48 x 100% = 20%




Sample size calculation rust damage
Total length of the transverse cross: 40 cm
Damaged section: 10 cm
Calculation: 10/40 x 100% = 25%



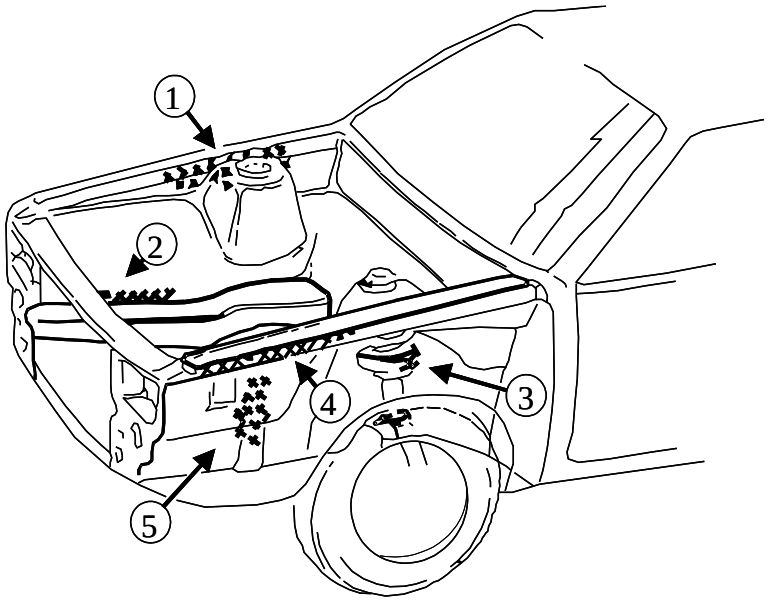
Sample mounting flanges

**Calculation examples**

**Example 1**

Schematic representation of the front part of a body that is rusted through in 5 places:

| | | | |
|---|---|---|---|
| 1. | anchoring of the coil spring housing (right-hand side) | : | ± 75% |
| 2. | attachment of the right-hand side wheel arch to the "chassis leg" | : | ± 30% of the attachment length |
| 3. | lower left spring cup for a hole of | : | ± 0,5 cm² |
| 4. | supporting longitudinal member above wheel arch (left-hand side) | : | ± 50% of the length |
| 5. | front part of the left wheel arch | : | ± 15% |




Examples of rust damage in an engine compartment

re 1: (wheel suspension)
Anchoring of the coil spring housing: degree of rust damage 8E.
Extent of the damage 75% in the area around the anchor:
75% of 8E = 6E → rejection

re 2: (wheel arch loaded)
Anchoring of the wheel arch at the bottom side: degree of rust damage 6E.
Extent of the damage 30% of the length of the edge (bottom attachment):
30% of 6E = 1.8E → approval

re 3: (spring attachment)
Spring cup: rusting through not allowed → rejection

re 4: (beams)
Supporting longitudinal member: degree of rust damage 4E.
Extent of the damage 50% of the length of the beam:
50% of 4E = 2E → approval

re 5: (body)
Wheel arch (non-full load-bearing frame): degree of rust damage 8E.
15% of 8E = 1.2E → approval

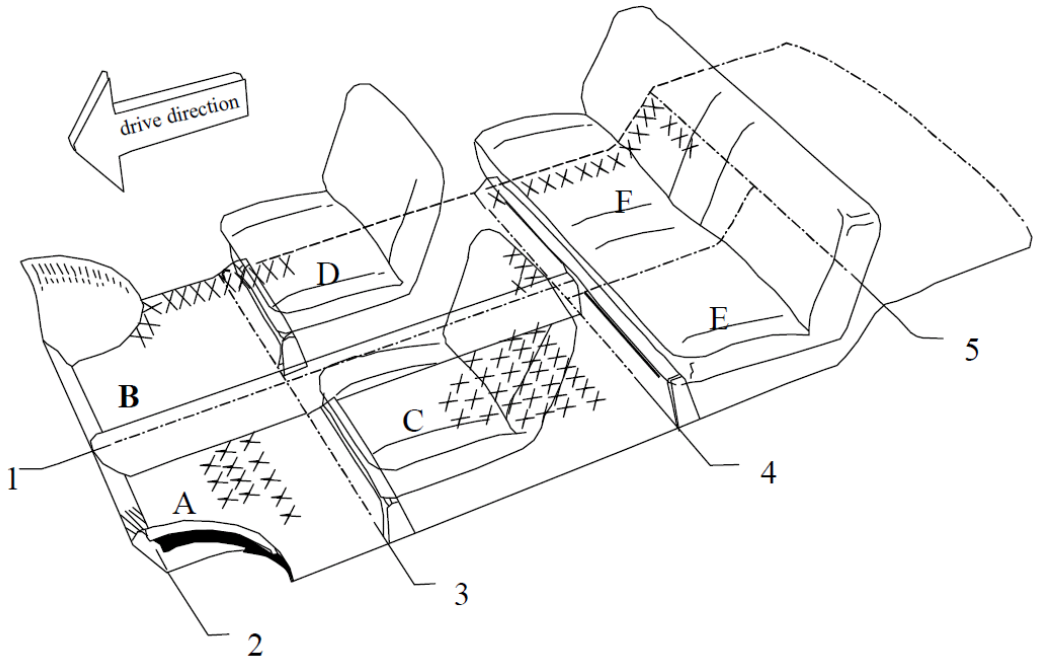
**Example 2**

Schematic top view of a bottom plate of a passenger car that does not have a full load-bearing frame

Bottom plate: degree of rust damage 8E.

Section line division:

1. Centre line length.
2. The beginning of the flat bottom plate.
3. Front of front seat in the rearmost position.
4. Front of following seat (back seat).
5. End bottom plate below passenger area.




Example of rust damage to a bottom plate

The extent of the rust damage is assessed per section:

Section A: The extent of the rust damage is 15% of the entire surface of the section:
15% of 8E = 1.2E → approval.

Section B: The extent of the rust damage is 20% of the entire length of the edges of the section:
20% of 8E = 1.6E → see additional assessment.

Section D: The extent of the rust damage is 10% + 10% of the entire length of the edges of the section:
20% of 8E = 1.6E → see additional assessment.

**Additional assessment:**

However, the rust damage in Sections B and D is a damage which extends WITHOUT INTERRUPTIONS through these sections. Section D is the largest. The extended rust damage in Sections B and D plus the other rust damage in Section D must be considered a single rust damage in
Section D.
The extent of the rust damage is 35% of the entire length of the edges of Section D:
35% of 8E = 2.8E → rejection.

Section C: The extent of the rust damage is 30% of the entire surface of the section:
30% of 8E = 2.4E → rejection.

Section E: No rust damage.

Section F: The extent of the rust damage is 35% of the entire length of the edges:
35% of 8E = 2.8E → rejection.

**Example 3**

Front door pillar of non-full load-bearing frame.

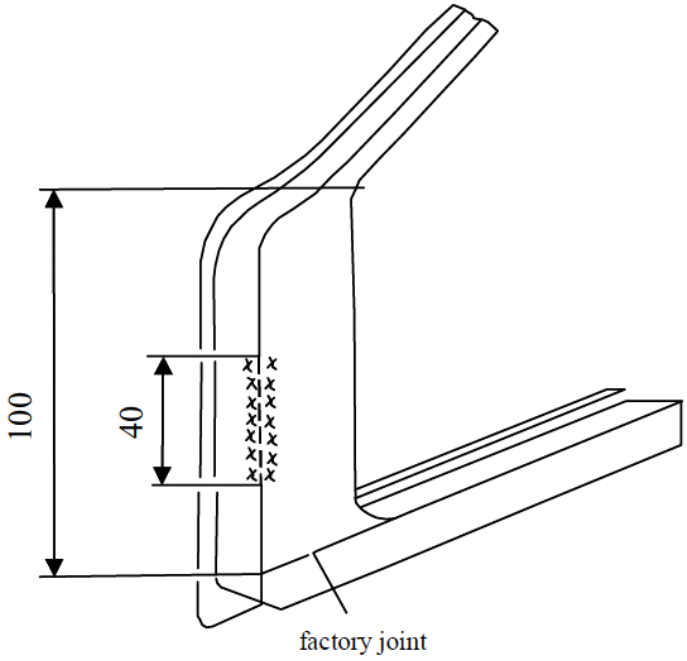
Door pillar: degree of rust damage $6^E$.

| | | |
|---|---|---|
| Rusted through in the longitudinal direction | : | 40 cm |
| In cross section | : | 10% |

Extent of rust damage

| | | |
|---|---|---|
| In longitudinal direction | : | 40 / 100 x 100% = 40% |
| In cross direction | : | 10% |
| Highest percentage is normative | : | 40% |

40% of 6E = 2.4E → rejection.




Example of rust damage to a front door pillar

**Example 4**

Middle door pillar of non-full load-bearing frame.

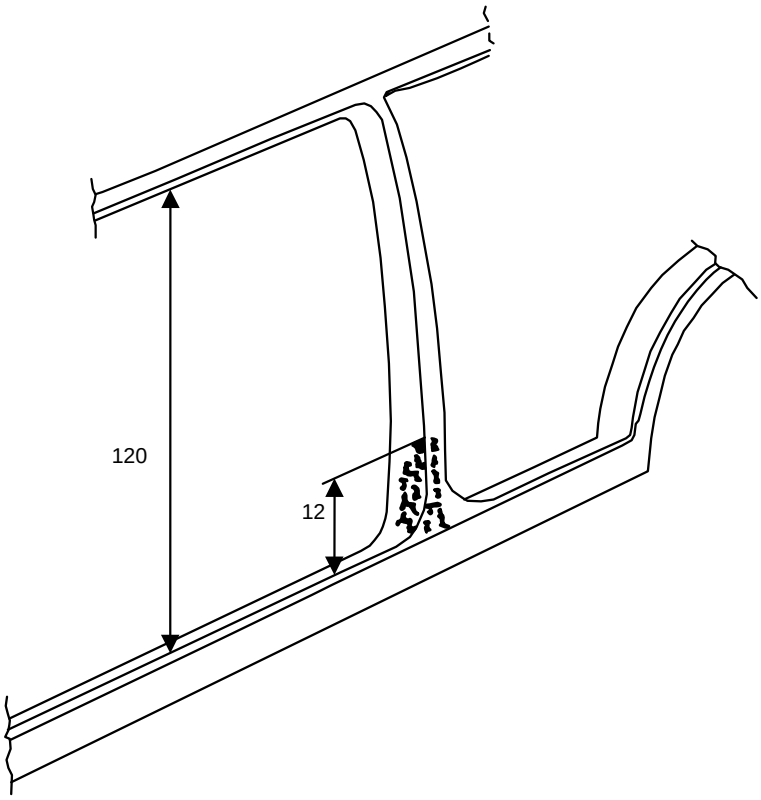
Door pillar: degree of rust damage 6E.

| | | |
|---|---|---|
| Rusted through in the longitudinal direction | : | 12 cm |
| In cross section | : | 50% |

Extent of rust damage:

| | | |
|---|---|---|
| In longitudinal direction | : | 12 / 120 x 100% = 10% |
| In cross direction | : | 50% |
| Highest percentage is normative | : | 50% |

50% of 6E = 3E → rejection



**Annex 4 (Load index), pertaining to Article 50, Paragraph 1**

Load index

| LI | Max. Load (kg) | LI | Max. Load (kg) | LI | Max. Load (kg) | LI | Max. Load (kg) |
|---|---|---|---|---|---|---|---|
| 0 | 45 | 51 | 195 | 101 | 825 | 151 | 3450 |
| 1 | 46.2 | 52 | 200 | 102 | 850 | 152 | 3550 |
| 2 | 47.5 | 53 | 206 | 103 | 875 | 153 | 3650 |
| 3 | 48.7 | 54 | 212 | 104 | 900 | 154 | 3750 |
| 4 | 50 | 55 | 218 | 105 | 925 | 155 | 3875 |
| 5 | 51.5 | 56 | 224 | 106 | 950 | 156 | 4000 |
| 6 | 53 | 57 | 230 | 107 | 975 | 157 | 4125 |
| 7 | 54.5 | 58 | 236 | 108 | 1000 | 158 | 4250 |
| 8 | 56 | 59 | 240 | 109 | 1030 | 159 | 4375 |
| 9 | 58 | 60 | 250 | 110 | 1060 | 160 | 4500 |
| 10 | 60 | 61 | 257 | 111 | 1090 | 161 | 4625 |
| 11 | 61.5 | 62 | 265 | 112 | 1120 | 162 | 4750 |
| 12 | 63 | 63 | 272 | 113 | 1150 | 163 | 4875 |
| 13 | 65 | 64 | 280 | 114 | 1180 | 164 | 5000 |
| 14 | 67 | 65 | 290 | 115 | 1215 | 165 | 5150 |
| 15 | 69 | 66 | 300 | 116 | 1250 | 166 | 5300 |
| 16 | 71 | 67 | 307 | 117 | 1285 | 167 | 5450 |
| 17 | 73 | 68 | 315 | 118 | 1320 | 168 | 5600 |
| 18 | 75 | 69 | 325 | 119 | 1360 | 169 | 5800 |
| 19 | 77.5 | 70 | 335 | 120 | 1400 | 170 | 6000 |
| 20 | 80 | 71 | 345 | 121 | 1450 | 171 | 6150 |
| 21 | 82.5 | 72 | 355 | 122 | 1500 | 172 | 6300 |
| 22 | 85 | 73 | 365 | 123 | 1550 | 173 | 6500 |
| 23 | 87.5 | 74 | 375 | 124 | 1600 | 174 | 6700 |
| 24 | 90 | 75 | 387 | 125 | 1650 | 175 | 6900 |
| 25 | 92.5 | 76 | 400 | 126 | 1700 | 176 | 7100 |
| 26 | 95 | 77 | 412 | 127 | 1750 | 177 | 7300 |
| 27 | 97.5 | 78 | 425 | 128 | 1800 | 178 | 7500 |
| 28 | 100 | 79 | 437 | 129 | 1850 | 179 | 7750 |
| 29 | 103 | 80 | 450 | 130 | 1900 | 180 | 8000 |
| 30 | 106 | 81 | 462 | 131 | 1950 | 181 | 8250 |
| 31 | 109 | 82 | 475 | 132 | 2000 | 182 | 8500 |
| 32 | 112 | 83 | 487 | 133 | 2060 | 183 | 8750 |
| 33 | 115 | 84 | 500 | 134 | 2120 | 184 | 9000 |
| 34 | 118 | 85 | 515 | 135 | 2180 | 185 | 9250 |
| 35 | 121 | 86 | 530 | 136 | 2240 | 186 | 9500 |
| 36 | 125 | 87 | 545 | 137 | 2300 | 187 | 9750 |
| 37 | 128 | 88 | 560 | 138 | 2360 | 188 | 10000 |
| 38 | 132 | 89 | 580 | 139 | 2430 | 189 | 10300 |
| 39 | 136 | 90 | 600 | 140 | 2500 | 190 | 10600 |
| 40 | 140 | 91 | 615 | 141 | 2575 | 191 | 10900 |
| 41 | 145 | 92 | 630 | 142 | 2650 | 192 | 11200 |
| 42 | 150 | 93 | 650 | 143 | 2725 | 193 | 11500 |
| 43 | 155 | 94 | 670 | 144 | 2800 | 194 | 11800 |
| 44 | 160 | 95 | 690 | 145 | 2900 | 195 | 12150 |
| 45 | 165 | 96 | 710 | 146 | 3000 | 196 | 12500 |
| 46 | 170 | 97 | 730 | 147 | 3075 | 197 | 12850 |
| 47 | 175 | 98 | 750 | 148 | 3150 | 198 | 13200 |
| 48 | 180 | 99 | 775 | 149 | 3250 | 199 | 13600 |
| 49 | 185 | 100 | 800 | 150 | 3350 | 200 | 14000 |
| 50 | 190 | | | | | | |

**Annex 5 (load index/speed symbol), pertaining to Article 50, Paragraph 4**

| speed (km/h) | Variation in axle load (%) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | All load indexes | | | | Load indexes [1] ≥ 122 | | Load indexes [1] ≤ 121 | | | |
| | Speed symbol | | | | Speed symbol | | Speed symbol | | | |
| | F | G | J | K | L | M | L | M | N | P2 |
| | | | | | | | | | | |
| 0 [2] | + 150 | + 150 | + 150 | + 150 | + 150 | + 150 | + 110 | + 110 | + 110 | + 110 |
| 5 [2] | + 110 | + 110 | + 110 | + 110 | + 110 | + 110 | + 90 | + 90 | + 90 | + 90 |
| 10 [2] | + 80 | + 80 | + 80 | + 80 | + 80 | + 80 | + 75 | + 75 | + 75 | + 75 |
| 15 [2] | + 65 | + 65 | + 65 | + 65 | + 65 | + 65 | + 60 | + 60 | + 60 | + 60 |
| 20 [2] | + 50 | + 50 | + 50 | + 50 | + 50 | + 50 | + 50 | + 50 | + 50 | + 50 |
| 25 [2] | + 35 | + 35 | + 35 | + 35 | + 35 | + 35 | + 42 | + 42 | + 42 | + 42 |
| 30 [2] | + 25 | + 25 | + 25 | + 25 | + 25 | + 25 | + 35 | + 35 | + 35 | + 35 |
| 35 [2] | + 19 | + 19 | + 19 | + 19 | + 19 | + 19 | + 29 | + 29 | + 29 | + 29 |
| 40 [2] | + 15 | + 15 | + 15 | + 15 | + 15 | + 15 | + 25 | + 25 | + 25 | + 25 |
| 45 | + 13 | + 13 | + 13 | + 13 | + 13 | + 13 | + 22 | + 22 | + 22 | + 22 |
| 50 | + 12 | + 12 | + 12 | + 12 | + 12 | + 12 | + 20 | + 20 | + 20 | + 20 |
| 55 | + 11 | + 11 | + 11 | + 11 | + 11 | + 11 | + 17.5 | + 17.5 | + 17.5 | + 17.5 |
| 60 | + 10 | + 10 | + 10 | + 10 | + 10 | + 10 | + 15.0 | + 15.0 | + 15.0 | + 15.0 |
| 65 | + 7.5 | + 8.5 | + 8.5 | + 8.5 | + 8.5 | + 8.5 | + 13.5 | + 13.5 | + 13.5 | + 13.5 |
| 70 | + 5.0 | + 7.0 | + 7.0 | + 7.0 | + 7.0 | + 7.0 | + 12.5 | + 12.5 | + 12.5 | + 12.5 |
| 75 | + 2.5 | + 5.5 | + 5.5 | + 5.5 | + 5.5 | + 5.5 | + 11.0 | + 11.0 | + 11.0 | + 11 0 |
| 80 | 0 | + 4.0 | + 4.0 | + 4.0 | + 4.0 | + 4.0 | + 10.0 | + 10.0 | + 10.0 | + 10.0 |
| 85 | – 3 | + 2.0 | + 3.0 | + 3.0 | + 3.0 | + 3.0 | + 8.5 | + 8.5 | + 8.5 | + 8.5 |
| 90 | – 6 | 0 | + 2.0 | + 2.0 | + 2.0 | + 2.0 | + 7.5 | + 7.5 | + 7.5 | + 7.5 |
| 95 | – 10 | - 2.5 | + 1.0 | + 1.0 | + 1.0 | + 1.0 | + 6.5 | + 6.5 | + 6.5 | + 6.5 |
| 100 | – 15 | - 5 | 0 | 0 | 0 | 0 | + 5.0 | + 5.0 | + 5.0 | + 5.0 |
| 105 | | - 8 | – 2 | 0 | 0 | 0 | + 3.75 | + 3.75 | + 3.75 | + 3.75 |
| 110 | | - 13 | – 4 | 0 | 0 | 0 | + 2.5 | + 2.5 | + 2.5 | + 2.5 |
| 115 | | | – 7 | – 3 | 0 | 0 | + 1.25 | + 1.25 | + 1.25 | + 1.25 |
| 120 | | | – 12 | – 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 125 | | | | | | 0 | – 2.5 | 0 | 0 | 0 |
| 130 | | | | | | 0 | – 5 | 0 | 0 | 0 |
| 135 | | | | | | | – 7.5 | – 2.5 | 0 | 0 |
| 140 | | | | | | | – 10 | – 5 | 0 | 0 |
| 145 | | | | | | | | – 7.5 | - 2.5 | 0 |
| 150 | | | | | | | | – 10 | - 5 | 0 |
| 155 | | | | | | | | | - 7.5 | - 2.5 |
| 160 | | | | | | | | | - 10 | - 5 |

1 The loading indexes relate to single-mounted tyres. The axle load for double mounted tyres is twice the axle load of single-mounted tyres.

2 For speed symbols higher than ‘P’, the value indicated under ‘P’ may be used as the value of the variation in axle load.