Preface

Driver and Vehicle Standards Agency

The MOT Inspection Manual

Private passenger and light commercial vehicle testing

Preface

This manual sets out the testing procedures and standards for those who carry out statutory testing of cars, private buses and light commercial vehicles.

Vehicle owners may also find the manual useful because it details the inspection to which vehicles are subjected and the reasons why an MOT test certificate could be refused.

This manual was based on the domestic legislation in force at the time of publication and complies with Annex I to Directive 2014/45/EU.

Future changes in legislation, or in vehicle or equipment design may result in variations to the test requirements.

General information regarding documentation and the responsibilities of those involved in testing are contained in the MOT Testing Guide by the Driver and Vehicle Standards Agency.

Written by the Driver and Vehicle Standards Agency

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Introduction

1 Abbreviations and definitions

Abbreviation or term	Definition
abandon	When a test can't be completed because the tester thinks it's unsafe to continue or because it becomes apparent during the test that certain items can't be satisfactorily inspected. An appropriate fee may be charged for the test.
abort	When a test can't be completed because of a problem with the test equipment or the tester. No fee may be charged for the test.
AE	Authorised Examiner – the organisation that operates and manages one or more VTS and is responsible for controlling the quality of testing carried out. Except in the case of a 'sole trader' the AE isn't a person but a legal entity, such as a company or partnership.
ATL	Automated test lane – lanes authorised by DVSA which use wheel play detectors and an automated roller brake tester
bodied vehicles	A bodied vehicle has a floor pan and surrounding panels. The vehicle may or may not have a roof. As a guide, if the driver sits in the vehicle with surrounding structure it would be classed as bodied.
bus	A motor vehicle which is constructed or adapted to carry more than 8 seated passengers (see also 'minibus')
category L2 vehicle	A three-wheeled vehicle (tricycle) classed as a moped – a maximum speed not exceeding 45km/h, not more than 50cc for spark ignition engine or 4KW for any other power unit
category L5 vehicle	A three-wheeled vehicle (tricycle) more than 50cc and/or a maximum speed greater than 45km/h
category L6 vehicle	Light quadricycle – four-wheeled vehicle with a maximum unladen mass of 350kg (not including the batteries in an electrically powered vehicle) a maximum speed not exceeding 45km/h, not more than 50cc for spark ignition engine or 4KW for any other power unit.
category L7 vehicle	Quadricycle – a four-wheeled vehicle with a maximum unladen mass 400kg or 550kg for a goods vehicle (not including the batteries in an electrically powered vehicle) and a maximum net power of 15KW (21BHP).
category M1 vehicle	A vehicle with 4 or more wheels used for the carriage of passengers, with no more than 8 passenger seats in addition to the driver's seat. This includes dual purpose vehicles, motor caravans and ambulances, but doesn't include quadricycles.
category M2 vehicle	A vehicle with 4 or more wheels used for the carriage of passengers, with more than 8 passenger seats in addition to the driver's seat and a maximum DGW not exceeding 5,000kg. This includes dual purpose vehicles, motor caravans and ambulances.
category M3 vehicle	A vehicle with 4 or more wheels used for the carriage of passengers, with more than 8 passenger seats in addition to the driver's seat and a maximum DGW exceeding 5,000kg
category N1 vehicle	A vehicle with 4 or more wheels used for the carriage of goods and having a DGW not exceeding 3,500kg

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coach	A motor vehicle constructed or adapted to carry more than 16 seated passengers, with a DGW of more than 7,500kg and a maximum speed in excess of 60mph
CT	Contingency testing – the test process using paper documentation when the online MOT testing service isn't available
CT20	An MOT test certificate issued during a period of contingency testing
CT30	A refusal of an MOT test certificate issued during a period of contingency testing
DGW	Design gross weight – the maximum gross weight that the vehicle was designed to operate at by the manufacturer. This is normally found on the manufacturer's plate fixed to the vehicle, or in some older or heavier vehicles on a `ministry plate'.
DVSA	The Driver and Vehicle Standards Agency
insecure	A component has relative movement (looseness) at its fixings where there should be none, a component has relative movement (looseness) to an associated component where there should be none, or a component critical to safety isn't safely or completely attached at its fixing or to an associated component
large Class 4	A Class 4 vehicle with a DGW greater than 2,500kg
MAM	Maximum authorised mass – the maximum gross weight permissible in Great Britain
MIL	Malfunction indicator lamp
minibus	A motor vehicle constructed or adapted to carry more than 8 but not more than 16 seated passengers (see also 'bus')
ministry plate	Displays the maximum authorised weights at which a vehicle may be operated. This information supersedes the maximum weights displayed on the manufacturer's plate.
MOT Testing Guide	A handbook for MOT scheme administration available online at https://www.gov.uk/topic/mot/manuals
MOT testing service	Internet based system for registering MOT tests, producing MOT documentation and performing certain administrative functions
OPTL	One-person test lane – authorised by DVSA to conduct testing where the tester can conduct a test without an assistant
QC	Quality control
special notice	An official notice by DVSA to inform AEs, NTs and other system users of changes and developments to the testing scheme or highlight areas of concern
ULW	Unladen weight – the weight of a vehicle inclusive of the body and all parts which are ordinarily used with the vehicle when working on a road. Unladen weight doesn't include the weight of water or fuel used for the propulsion of the vehicle, or of loose tools and loose equipment.
VT20	An MOT test certificate which includes the Welsh language version (VT20W)
VT30	A notice of refusal of a MOT test certificate including the Welsh language version (VT30W)
VTS	Vehicle Testing Station
V5/V5C	Vehicle registration certificate issued by the Driver and Vehicle Licensing Agency

you	MOT tester

2 Application (Classes 3, 4, 5 and 7)

This manual is a detailed guide to the inspection for statutory MOT testing of the following classes:

Class	Vehicle type
Class 3	Three-wheeled vehicles not exceeding 450kg ULW (excluding motorcycle combinations) – category L2 or L5
Class 4	Three-wheeled vehicles more than 450kg ULW – category L5 Quadricycles – category L6 or L7 Cars and Taxis – category M1 Minibuses, motor caravans, dual purpose vehicles and ambulances up to 12 passenger seats – category M1 or M2 American pickups up to 6500kg DGW Goods vehicles not exceeding 3,000kg DGW – category N1
Class 5	Private passenger vehicles, ambulances and motor caravans with 13 or more passenger seats – category M2 or M3
Class 7	Goods vehicles between 3,001kg and 3,500kg DGW inclusive – category N1 Please note: If a goods vehicle is presented with a manufacturer's plate and a 'ministry plate' the weights to be used are those on the 'ministry plate'

Some Class 7 testing stations are approved to test Class 5 vehicles with a DGW up to 5,000kg referred to as Class 5L (category M2). Class 5L doesn't include any vehicle that must have a seatbelt installation check. Such vehicles must be presented at a Class 5A testing station.

Definitions of sub-Classes 4A and 5A are given in the MOT Testing Guide.

Dual purpose vehicles are defined in the MOT Testing Guide. The unladen weight of a dual-purpose vehicle mustn't exceed 2,040kg. However, 4 × 4 pickup vehicles with a DGW over 3,000kg up to and including 3,500kg are considered dual purpose vehicles for test purposes if information about the unladen weight isn't available.

American pickup means a motor vehicle manufactured in the United States of America or Canada that meets all of the following criteria:

- it's capable of carrying a driver and at least one passenger
- it's capable of carrying goods in an open load bed separate from the driver/passenger compartment, with or without a removable cover
- it has a gross design weight over 3,000kg but doesn't exceed 6,500kg

Pickup vehicles with a fifth-wheel shouldn't be considered articulated vehicles. They should be tested as normal.

To determine the seating capacity of a passenger vehicle, the number of occupied wheelchairs that can be carried should be added to the number of seats.

Other than for the inspection of tyres, any 2 wheels of a vehicle shall be regarded as one wheel if the distance between the centres of the areas of contact between such wheels and the road surface is

less than 460mm. You should be aware that this may affect the test class. For example, a three-wheeled vehicle with a wheel layout meeting this criterion must be tested as a motorcycle.

Tricycle and quadricycle test classes

Vehicle type	Description	Test class
three-wheeled moped (L2)	Three-wheeled vehicle with a max speed of 45km/h, not over 50cc for a petrol engine or 4KW for any other engine or electric motor, not more than 450kg ULW	3
motor tricycle (L5)	Three-wheeled vehicle with wheels symmetrically arranged, a max speed over 45km/h, or engine size over 50cc, not more than 450kg ULW	3
motor tricycle (L5)	Three-wheeled vehicle with wheels symmetrically arranged with a max speed over 45km/h, or engine size over 50cc, more than 450kg ULW	4
light quadricycle (L6)	Four-wheeled vehicle with a max ULW of 350kg, max speed of 45km/h and not over 50cc for a petrol engine or 4KW for any other engine or electric motor	4
quadricycle (L7)	Four-wheeled vehicle with a max ULW of 400kg (550kg for a goods vehicle) with a max net power of 15KW	4

If any of the above vehicles are electrically powered, their unladen weight mustn't include the weight of the batteries.

If there is significant doubt about the power output or the weight of the vehicle, the presenter must provide documentary evidence.

3 Vehicles of historical interest (over 40 years old)

Some vehicles of historical interest may be exempt from statutory MOT testing. Such vehicles must be over 40 years old and not substantially changed.

Owners of these vehicles may still request a statutory test be conducted. In these circumstances, you must register the test on the MOT testing service and carry it out in the usual way and issue the appropriate documentation.

You should remember that certain components on historic vehicles may have been manufactured to have a greater degree of play or tolerance than is found in modern vehicles.

If you, or your assistant, aren't familiar with the controls of a historic vehicle, you should ask the vehicle presenter to operate or demonstrate the controls.

4 Refusal to test

Legislation permits testers to refuse to test vehicles in certain circumstances. If any of the reasons for refusal (see below) apply, you shouldn't carry out the test and must return any fee paid for the test. You should carry out appropriate pre-checks before starting the test, to ensure the suitability and general condition of the vehicle.

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If the vehicle presenter needs written confirmation of why the test can't be carried out, you should register the test using the MOT testing service and issue a VT30 clearly showing the reason(s) why the test couldn't be carried out.

If reason to refuse 'i' applies, you should issue a hand written CT30 containing as many of the vehicle details as possible. A copy of the CT30 should be retained by the VTS.

The reasons for refusing to carry out the test are:

a. The V5C or other evidence of the date of first use isn't produced. Normally this evidence is only necessary if the vehicle has a 'cherished' registration mark (also referred to as personalised registration number) or if the registration mark's year letter doesn't make it clear which standard should be applied.

b. The vehicle or any part or equipment on the vehicle is so dirty that examination is unreasonably difficult.

c. The vehicle isn't fit to be driven when necessary to complete the test because of a lack of fuel, or oil, or for any other reason.

d. The tester considers a load or other items, or insecurity of a load or other items, would prevent a proper test being carried out – unless the load is secured or removed.

e. The VTS asks for the fee to be paid in advance and this isn't done.

f. The vehicle emits substantial quantities of avoidable smoke.

g. A proper examination can't be carried out because any door, tailgate, boot, engine cover, fuel cap or other device designed to be easily opened can't be easily opened.

h. The condition of the vehicle is such that, in the opinion of the tester, a proper examination would involve a danger of injury to any person or damage to the vehicle or other property.

i. The vehicle has neither a registration mark nor VIN/chassis number or frame number by which it can be identified, or that all such identifications are illegible or use letters and numbers not normally used in the English language.

If despite due care initially, it becomes apparent during a test that the test can't be completed for any of the above reasons, the test must be abandoned, or the vehicle failed because the test couldn't be satisfactorily completed. Any subsequent re-examination and fee must be in line with normal policy. See the 'MOT fees and appeals' poster (VT9A) for further information.

In addition to the above reasons you must decline to test any vehicle that isn't of a class you are authorised to test or it's of such a size, weight or configuration that it can't be properly or safely tested on the approved facilities. There are, however, exceptions for narrow track vehicles.

5 Narrow track vehicles

If a vehicle has a track width that is too narrow for the vehicle to be safely tested on the approved pit or hoist, the inspection can be carried out on an area of hard standing within the testing facility. However, this only applies where the headlamp aim test can be conducted using the approved equipment and with the vehicle placed in the headlamp aim standing area.

You should use appropriate test methods covering all testable items set out in the inspection manual. For checks where wheels must be raised clear of the ground, you should use a suitable jack. Turning plate checks will need to be carried out on hard standing as best as possible.

If a roller/plate brake test can't be carried out, due to the narrow track width or the transmission type, then a decelerometer test must be conducted.

If you have health and safety concerns regarding these procedures or the suitability of the test equipment, you should decline to test the vehicle.

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6 Vehicle ‘first used’ dates – Application of test criteria

Usually you'll be given the vehicle details as part of the registration process. This will usually include the vehicle’s ‘first used’ date. If the ‘first used’ date is known, you should only use defects applicable to the vehicle’s age.

When the ‘first used’ date isn't known or incorrect, you should determine the vehicle’s ‘first used’ date as follows:

a. Its date of manufacture, if the vehicle was originally used without being registered in Great Britain, such as an imported vehicle or ex-HM Forces vehicle.

b. Vehicles having a Q plate registration when presented for MOT are to be treated as follows:

- for emission purposes only, they are to be considered as first used before 1 August 1975
- for all other testing purposes they are to be considered as being first used on 1 January 1971

c. In any other case, the earlier of either its date of first registration or the date 6 months after it was manufactured, for example, vehicles first used before 1 September 2001 don’t need to have anti-theft device. However, a vehicle first used after that date, but manufactured at least 6 months before that date (before March 2001) would still not need an anti-theft device to be fitted.

You should enter this information onto the MOT testing service so that you can select the appropriate defects.

7 The MOT Inspection Manual

Although this manual is publicly available, it's specifically written for MOT testers. It specifies the applications, procedures and standards to be used for MOT testing. You must read it with any current special notices relevant to the class or type of vehicle under test.

You should familiarise yourself with the contents of the manual and any amendments to it, including special notices which affect test procedures or standards.

Defects found during the MOT test will be categorised in one of the following groups:

- minor – defects that have no significant effect on the safety of the vehicle or impact on the environment and other minor non-compliances
- major – defects that may prejudice the safety of the vehicle, have an impact on the environment, put other road users at risk or other more significant non-compliances
- dangerous – defects that are a direct and immediate risk to road safety or having an impact on the environment

If a vehicle has only minor defects, it will pass its MOT inspection and a test certificate will be issued. If a vehicle has any major or dangerous defects, it must be failed and a refusal notice issued.

8 Vehicle technical data

The MOT testing service may give testers technical information about certain vehicles under test. This is to help testers choose the correct the test methods and/or apply the correct standards.

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9 The MOT Testing Guide

The MOT Testing Guide explains what is required of persons and organisations authorised to conduct statutory tests on certain motor vehicles. It also includes, among other things, information on the administration of the MOT scheme, disciplinary procedures and equipment calibration requirements.

10 Assessment of component condition

It isn’t practical to lay down limits of wear and tolerance for all types of components on different models of vehicle, or to define acceptable amounts of damage, deterioration and effectiveness. You are therefore expected to use your knowledge, experience and judgement to assess if the condition of a component has reached the stage where it's obviously adversely affecting its functionality or likely to adversely affect the roadworthiness of the vehicle.

11 Definition of insecure

The term 'insecure' is used throughout this manual to describe a defective condition. This term should be taken to mean one of the following:

- a component has relative movement (looseness) at its fixings where there should be none
- a component has relative movement (looseness) to an associated component where there should be none
- a safety critical component isn't safely or completely attached at its fixing or to an associated component

Certain components, such as wheel fixings, batteries, body mountings have specific criteria detailed in the manual.

12 Unsafe modification

Modifications to vehicles must be assessed on their merits, taking account of the nature of the modification and whether the component is critical to safety.

A modification is unsafe if it:

- adversely affects the roadworthiness of the vehicle
- is likely to cause injury, such as modification to the body
- has a disproportionately adverse effect on the environment

13 Extensively modified vehicles

If a vehicle has been extensively modified or converted, certain defects, such as for components ‘missing where fitted as standard’ shouldn't be applied, for example:

- a car converted for competition rally use must have the rear seats removed, be fitted with a roll cage and full harness seat belts, may not be fitted with components such as brake servo, power steering or airbags
- a car converted to a stretch limousine may no longer be fitted with items such as curtain airbags or a functional electronic stability control system

This exemption doesn’t apply to vehicles with minor modifications. Therefore, a car fitted with rally style seats, body kit and a sports steering wheel wouldn’t be exempt from the requirement to have a driver’s airbag if one was fitted as standard equipment.

Vehicles modified for disabled use must be assessed on their merits. For example, it's acceptable for the driver’s airbag to be removed for a wheelchair user, but the SRS warning lamp mustn't indicate a system malfunction.

14 Inspection procedure

You are advised to carry out pre-checks to ensure the general condition and suitability of the vehicle for test. Other than when using a CT code, a test mustn’t commence until you have registered the vehicle for test in the MOT testing service (see MOT Testing Guide).

When registering a vehicle for test, the actual details from the vehicle must be used. It isn't acceptable to use details from other sources such as the V5C, job card or previous electronic record.

The tester who registered the vehicle for test must personally carry out the test, without avoidable distraction or interruption and only the tester is empowered to make decisions about the test results. Unless the test facility is approved for one person testing, the tester must use a suitable assistant for certain parts of the inspection.

It may be convenient to conduct the emissions test at the beginning of the inspection if the engine is still warm.

Small tools, such as pinch bars, levers and the corrosion assessment tool must be used where necessary. A hand-held inspection mirror may be used to facilitate the inspection but isn't mandatory.

The MOT test must be carried out without dismantling, so it isn’t always possible to inspect some testable items. Bonnets, engine covers, luggage compartments, access flaps and passenger compartment doors must be opened when it's necessary to inspect testable items. If for example a bonnet, door or access panel designed to be easily opened can’t be opened, so preventing access to a testable item, you must either abandon or refuse to carry out the test.

You should take care when jacking up vehicles to avoid causing damage and refer to manufacturers’ information if available. Particular care is needed when jacking vehicles fitted with pneumatic, hydraulic or self-levelling suspension.

Once the inspection is completed, you must record the test results using the MOT testing service (see MOT Testing Guide).

If testing under CT, you must calculate the brake efficiencies and retain the readings for later data entry. You should record all results on the VT29 and retain any printout. Refer to the MOT Testing Guide for a full explanation of CT procedures.

Recommended inspection routine

Diagrams 1 and 2 (see below) show a typical inspection routine. These routines may need to be varied to suit different test bay layouts and equipment types. It's recommended that you don't carry out the brake performance test until after the rest of the inspection to prevent an unknown defect causing injury to a person, damage to the vehicle or other property.

Diagram 1. Topside inspection routine

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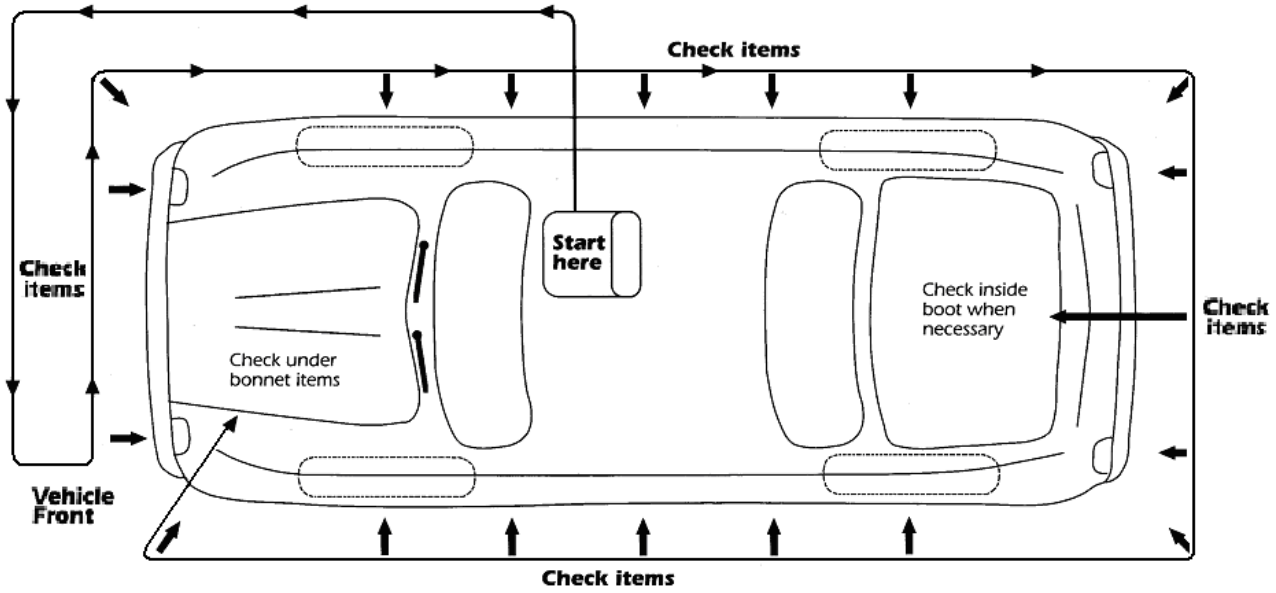
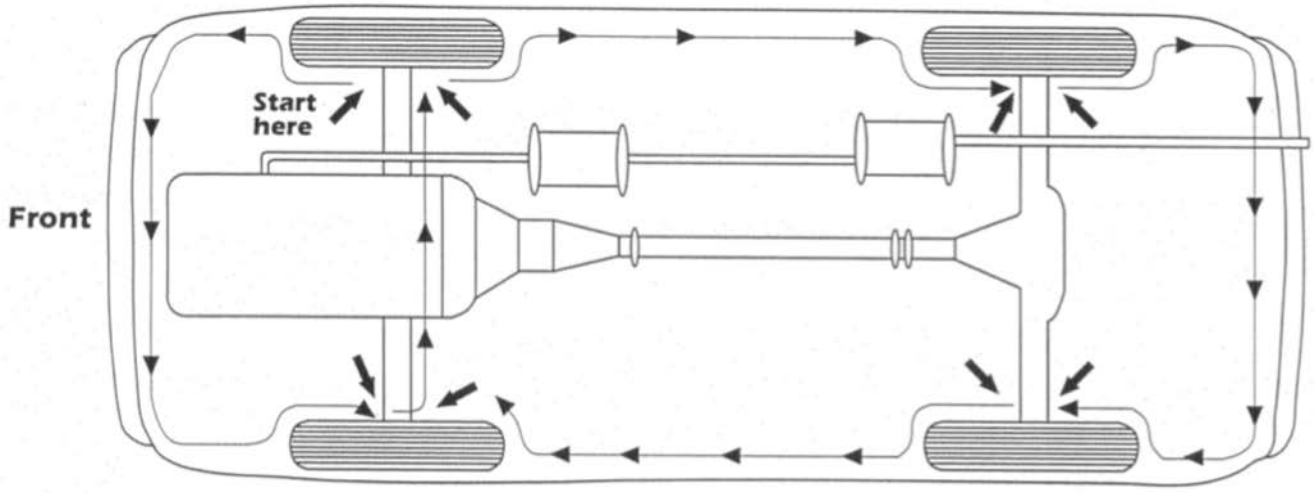


Diagram 2. Underside inspection routine



Operations

1. With the wheels in the straight ahead position and supporting the vehicle weight, inspect the vehicle underside following the routine shown. If using a lift for the underside inspection, it's recommended that the rear wheels are chocked whilst the lift is raised.
2. Jack up the front and rear wheels to check relevant items. For vehicles with a DGW exceeding 5,000kg only jack the front wheels.
3. Carry out the headlamp aim check and brake performance test at a convenient point in the routine depending on the layout of the equipment.

15 Road testing

The statutory test doesn't specifically include a road test of the vehicle. However, one is permitted if you think it's necessary to check the results of an inspection. You must be properly licensed to drive the vehicle and ensure the vehicle is in a safe condition to conduct the road test.

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16 Disabled driver's controls

If a disabled driver's controls or fitments are additional to the standard driver's controls and they don't adversely affect the standard vehicle equipment, they aren't testable items. However, if any such equipment is seen to be defective it should be reported to the vehicle presenter.

Disabled driver's controls or fitments that replace or affect the standard controls should be tested in the normal way and any defects should be recorded in the normal way.

17 Health and safety

AEs and their staff are reminded of their obligation to adhere to all relevant health and safety legislation while MOT testing. Further advice can be obtained from your local health and safety enforcement officer or local authority environmental health officers as appropriate.

You should take care when testing electric and hybrid vehicles as:

- there may be high voltage present at any one of several points around the vehicle, including storage capacitors and batteries
- on hybrid vehicles, the engine may start without warning when electrical equipment is operated or if the battery voltage drops

18 Recording defects

Defects covered in this manual are selected from a component-based menu system in the MOT testing service. You will first select the appropriate component from the main component list and then make further selections from the sub-menu(s). Once you've selected the appropriate component, a list of defects will be available for selection.

Various categories of defect may be available for the same item depending on the nature or severity of the defect – minor, major or dangerous. You must select the appropriate category, guided by the defect wording and using your knowledge, experience and judgement.

When an item isn't sufficiently deteriorated to justify rejection, there may be an option to select 'advisory' to inform the presenter of this fact.

When only minor defects have been selected, a test certificate will still be issued. Unlike advisory items, the use of minor defects, where appropriate, is mandatory.

If you think that a defect on a non-testable item is dangerous, you should explain it to the vehicle presenter.

Some defects listed in the inspection manual may not be accessible if they aren't relevant due to the age or test class of the vehicle. However, advisory items (if appropriate) for these defects may still be selectable.

19 Retest following failure

Information on retest fees and procedures can be found in the current MOT Testing Guide and on the 'MOT fees and appeals' poster (VT9A).

When carrying out a partial retest you must examine:

- all the previously failed item(s)
- any item(s) that may have been affected by the repairs
- any minor defect or item advised on at the time of the initial test

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If during a retest it's clear that the vehicle has any major or dangerous defects, you must issue a new VT30.

0 Identification of the vehicle

Section 0 – Contents

0 Identification of the vehicle

0.1 Registration plates

You must check the registration plates on all vehicles except for:

- unregistered vehicles
- foreign registered vehicles
- diplomatic vehicles
- military vehicles

The inspection doesn't include:

- the suppliers name outside of the minimum margin around the registration number
- postcode outside of the minimum margin around the registration number
- BS number outside of the minimum margin around the registration number
- logos or emblems outside of the minimum margin around the registration number

Three-wheeled vehicles that don't have a body type which is characteristic of the body of a four-wheeled vehicle don't require a front number plate. All other vehicles, including quadricycles, must be fitted with front and rear registration plates, which must both be checked to ensure the registration number displayed is the same.

Registration plates mustn't:

- be obscured, excessively damaged, deteriorated or delaminated
- have background overprinting
- have any feature or fixing that has the effect of changing the appearance or legibility of any of the characters
- have a honeycomb or similar effect background on vehicles first registered on or after 1 September 2001 – back lit registration plates may have a honeycomb type construction which shouldn't be confused with a honeycomb effect background

You should pay particular attention to the position of any fixing screws or bolts as well as any delamination of the number plate as this can prevent identification of the vehicle by automatic number plate recognition (ANPR) cameras which 'see' any non-reflective material as being black.

Registration plates may:

- have an optional non-reflective border displayed within the margin – this must be no wider than 6mm and not within 5mm of the characters
- display white, grey or silver characters on a black background – only on vehicles manufactured before 1 January 1978

Registration plate characters:

- may contain grey, possibly to achieve a 3D effect
- must be the correct size, stroke width and spacing
- mustn't be italic, sloping or formed using broken or multiple strokes
- must be laid out in the correct format for the age of vehicle
- must be formed using the prescribed font or be substantially similar to the prescribed font – as shown below

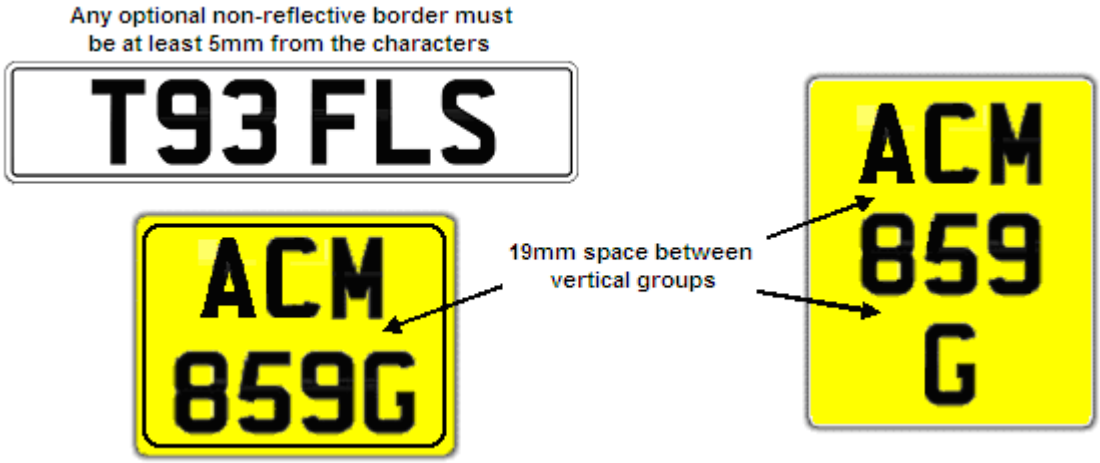
0 Identification of the vehicle

You don't have to physically measure the characters or their spacing and you should only reject them if they are obviously incorrect.

Registration plates fitted to vehicles manufactured on or after 1 January 1978 must:

- have black characters on a white background when fitted to the front
- have black characters on a yellow background when fitted to the rear
- be fitted vertically, or as close to vertical as is reasonably practicable

Registration plates may be in a single or two line formats. Additionally, a three line format is permitted on vehicles first used before 1 September 2001.



Registration plates must meet the dimensional requirements shown in the example below. However, the space between a number '1' or a letter 'I' and another character is permitted to be proportionately greater.

Vehicles with non-date related plates, such as those issued before 1963 and Northern Ireland plates must still meet the separation requirement between groups of characters where relevant.

Vehicles registered before 1 September 2001 can have larger plates fitted with characters 89mm high and other relevant dimensions that are subsequently larger.

0 Identification of the vehicle

Imported vehicles that don't have the space for standard sized registration plates can have smaller registration plates.

Defect	Category
(a) Number plate missing or so insecure that it is likely to fall off	Major
(b) Number plate inscription missing or illegible	Major
(c) Number plate showing an incorrect registration	Major
(d) Number plate does not conform to the specified requirements	Major

0.2 Vehicle identification number (VIN)

You must check the vehicle is displaying a legible vehicle identification number.

A vehicle identification number (VIN or chassis number) is required on:

- kit cars and amateur built vehicles first used on or after 1 September 2001
- all other vehicles first used on or after 1 August 1980

Vehicles may have the VIN displayed in more than one location, but only one VIN is required to be complete and legible.

Multi-stage build vehicles can have 2 VINs, both of which may have the same last 8 digits.

In these circumstances, when registering the vehicle for test, enter the last 6 digits of either VIN, along with the registration number. If the MOT testing service finds a match against either full VIN this should be accepted.

If you don't find a match in the MOT testing service, create a new vehicle record using the converter's VIN.

A converter's serial number isn't a VIN.

Defect	Category
(a) VIN missing or cannot be found	Major
(b) VIN incomplete, illegible or obviously falsified	Major

1 Brakes

Section 1 – Contents

1 Brakes

1.3 Secondary brake performance and efficiency

1.3.1 Performance

1.3.2 Efficiency

1.4 Parking brake performance and efficiency

1.4.1 Performance

1.4.2 Efficiency

1.5 Additional braking device (retarder) performance

1.6 Anti-lock braking system (ABS)

1.7 Electronic braking system (EBS)

1.8 Brake fluid

1 Brakes

1.1 Condition and operation

1.1.1 Service brake pedal or hand lever pivot

Defect	Category
(a) Pivot too tight	Major
(b) Excessive wear or free play	Major

1.1.2 Service brake pedal or hand lever condition and travel

A brake pedal rubber is an anti-slip material and is therefore not regarded as a defect if it's worn smooth.

A brake pedal without a rubber usually has grooves or raised sections to provide grip in wet conditions and should be rejected if it's worn smooth. However, some vehicles may have been manufactured with a brake pedal which did not incorporate grooves or the fitting of an anti-slip material and these should not be rejected.

You should reject a brake pedal if its grooves or raised grip sections are worn smooth. However, you shouldn't reject a brake pedal if the vehicle has been manufactured with one that doesn’t have grooves or anti-slip material.

Often a vehicle is fitted with an aftermarket brake pedal rubber. It isn’t a defect if the design pattern of the brake pedal rubber is worn smooth.

A vehicle should only be failed for insufficient reserve if the pedal or lever is touching the floor/handlebar. Checks on vehicles with power-assisted braking systems should be carried out with the engine off.

It may be possible on motorcycle derived systems for the brake lever to touch the handlebar. In such cases the extent of reserve travel should be assessed during the brake test.

Defect	Category
(a) Insufficient reserve travel	Major
(b) Service brake control:	
(i) not releasing correctly	Minor
(ii) functionality of brakes affected	Major
(c) Anti-slip provision missing**,** loose or worn smooth	Major

1.1.3 Air and vacuum systems

Vehicles first used before 1 October 1937 don’t need to be tested for air and vacuum systems.

A vehicle with an ULW up to and including 3,050kg, with a reservoir coupled direct to the induction manifold or a reservoir integral in a servo unit, doesn't need to be fitted with a warning device.

To check the build-up of air or vacuum:

1. Completely empty the reservoir by repeatedly pressing the service brake pedal.
2. Start the engine and run it at just below the governed speed if diesel, or at 2,000rpm if petrol.

3. Check the time it takes for the warning device to stop operating. Pressure build-up is considered satisfactory if the warning device stops operating within:
    - 3 minutes for pressure systems
    - 1 minute for vacuum systems

For checks that require reference to a pressure or vacuum gauge warning mark, but no warning mark is present, the following reference values should be used:

- 45psi (3.1kg/cm^2 or 3 bar) for a pressure gauge
- 10” to 12” (25 to 30cm) for a vacuum gauge

Defect	Category
(a) Insufficient pressure/vacuum assistance for less than:	
(i) four brake applications after the warning device has operated (or gauge shows an unsafe reading)	Major
(ii) two brake applications after warning device has operated (or gauge shows an unsafe reading)	Dangerous
(b) Time taken to build up air pressure/vacuum to safe working value not in accordance with the requirements	Major
(c) Repeated operation of any ancillary air or vacuum system completely depletes the stored air or vacuum for the braking system	Major
(d) Air leak causing a noticeable drop in pressure or audible air leak	Major
(e) External damage likely to affect the function of the braking system	Major

1.1.4 Low pressure warning

Vehicles first used before 1 October 1937 don’t need to be tested for low pressure warning.

A vehicle with an ULW up to and including 3,050kg with a reservoir coupled direct to the induction manifold or a reservoir integral in a servo unit, isn't necessarily required to be fitted with a warning device.

Warning devices may be visual or audible but only one needs to work if both are fitted.

Some vehicles with full power hydraulic braking systems will illuminate the low pressure warning light as soon as the ignition is switched on. It isn’t a defect unless the warning light stays on after the engine has been started.

Defect	Category
(a) Low pressure warning gauge or indicator:	
(i) malfunctioning or defective	Minor
(ii) not identifying low pressure	Major

1.1.5 Hand operated brake control valve

All vehicles with a secondary brake control – in addition to or in place of the normal parking brake lever – must be inspected.

Defect	Category
(a) Control cracked, damaged or excessively worn	Major
(b) Control insecure on valve or valve insecure	Major
(c) Loose connections or leaks in the system	Major
(d) Malfunctioning	Major

1.1.6 Parking brake lever or control

Vehicles first used before 1906 don't need to have a parking brake.

Some defects in this sub-section may not apply to the type of parking brake fitted.

A parking brake lever must have obvious excessive travel before being rejected.

An Electronic Parking Brake (EPB) may apply automatically in certain conditions, such as when the ignition is switched off or when the driver's door is opened. Testers should be aware of this throughout the test.

Quadricycles may be fitted with one of the following types of parking brake:

- an over-centre lever that is mounted on handlebars
- a gear lever that operates a cable when it's moved into the park position
- a transmission lock, which is the 'P' position on machines with continuously variable transmission (CVT)

These machines are type approved and shouldn't be rejected for design features that prevent them from meeting the stated requirements.

If the parking brake is the 'P' position on the gearbox, the efficiency of the brake can't be tested. The tester must therefore assess the brake by using a gradient (ideally 16%), or by attempting to push the machine when 'P' is selected.

The over-centre lever type can be brake tested as normal using one of the approved test methods.

Defect	Category
(a) Ratchet not holding correctly	Major
(b) Parking brake lever pivot or ratchet mechanism:	
(i) obviously worn	Minor
(ii) worn to the extent that the brake may inadvertently release	Major
(c) Parking brake lever has excessive movement indicating incorrect adjustment	Major
(d) Parking brake control missing, defective or inoperative	Major
(e) Electronic parking brake MIL indicates a malfunction	Major

1.1.7 Brake valves

Defect	Category

(a) Valve:	
(i) damaged or excessive air leak	Major
(ii) leaking such that brake functionality is affected	Dangerous
(b) Excessive oil discharge from a compressor or brake valve	Minor
(c) Valve insecure or inadequately mounted	Major
(d) Hydraulic fluid:	
(i) leak from a brake valve	Major
(ii) leak from a brake valve such that brake functionality is affected	Dangerous

1.1.8 Not in use

1.1.9 Pressure storage reservoirs

Vehicles first used on 1 October 1937 or later must have their air and air/hydraulic braking systems inspected.

Defect	Category
(a) Reservoir:	
(i) has minor damage or corrosion	Minor
(ii) heavily damaged, heavily corroded or leaking	Major
(b) Drain device on an air brake system:	
(i) operation affected	Minor
(ii) inoperative	Major
(c) Reservoir insecure or inadequately mounted	Major

1.1.10 Brake servo units and master cylinder (hydraulic systems)

Hydraulic brake fluid level checks are confined to transparent reservoirs or where an indicator is fitted. Reservoir caps shouldn't be removed.

A brake fluid warning lamp may be shared with other components, for example to indicate that brake pads are worn or the parking brake is applied. Class 3 vehicles aren't inspected for brake fluid warning lamp.

Defect	Category
(a) Brake servo:	
(i) defective or ineffective	Major
(ii) inoperative	Dangerous
(b) Master cylinder:	
(i) defective but brake still operating	Major
(ii) leaking	Dangerous

(c) Master cylinder insecure.	Major
(d) Brake fluid:	
(i) below minimum mark	Minor
(ii) significantly below minimum mark	Major
(iii) not visible	Dangerous
(e) Master cylinder reservoir cap missing	Minor
(f) Brake fluid warning light illuminated or defective	Minor
(g) Incorrect functioning of brake fluid level warning device	Minor

1.1.11 Rigid brake pipes

If the metal brake pipes have surface dirt that needs to be removed before it's possible to assess their condition, you can lightly scrape the pipe with a specialist brake pipe corrosion tool or the corrosion assessment tool 'spade end'. It must be done with care so that any protective coating doesn't get damaged.

Chafing, corrosion or damage to a rigid brake pipe so that its wall thickness is reduced by 1/3 (approximately 0.25 mm for typical hydraulic brake pipe) justifies rejection, although it's accepted that this isn't easy to determine. If you aren't sure whether the pipe is sufficiently deteriorated to justify rejection, you should give the benefit of the doubt.

Defect	Category
(a) Brake pipe is at imminent risk of failure or fracture	Dangerous
(b) Leaking brake pipe or connection:	
(i) on an air brake system	Major
(ii) on a hydraulic systems	Dangerous
(c) Brake pipe damaged or excessively corroded	Major
(d) Brake pipe:	
(i) inadequately clipped or supported	Minor
(ii) likely to become detached or damaged	Major

1.1.12 Flexible brake hoses

You should reject a hose for being excessively damaged or chafed only if it's severe enough to expose the reinforcement.

Defect	Category
(a) Brake hose damaged and likely to fail	Dangerous
(b) Flexible brake hose:	
(i) Slightly damaged, chafed or twisted	Minor
(ii) excessively damaged, chafed, twisted or stretched	Major
(c) Brake hoses or connections leaking on:	

(i) air brake systems	Major
(ii) hydraulic systems	Dangerous
(d) Brake hose bulging under pressure	Major
(e) Brake hose porous	Major

1.1.13 Brake linings and pads

Some vehicles have a warning light on the dashboard to indicate that the brake pads are becoming excessively worn. Sometimes this lamp is shared with other components, such as to show that the handbrake is applied. Testers must ensure that the lamp isn't lit for any other reason before failing it for being lit.

Defect	Category
(a) Brake lining or pad:	
(i) wear indicator illuminated	Major
(ii) worn below 1.5mm	Dangerous
(b) Brake lining or pad contaminated with oil, grease etc.	Major
(c) Brake lining or pad missing or incorrectly mounted	Dangerous

1.1.14 Brake discs and drums

A brake disc or drum must be significantly worn before you should reject it. Being worn below the manufacturer's recommended limits isn't a reason in itself.

Defect	Category
(a) Brake disc or drum:	
(i) significantly and obviously worn	Major
(ii) insecure, fractured or otherwise likely to fail	Dangerous
(b) Contaminated with oil, grease etc.	Major
(c) Missing	Dangerous
(d) Brake drum back plate insecure	Major

1.1.15 Brake cables, rods, levers and linkages

Defect	Category
(a) Cable damaged or knotted	Major
(b) Component excessively worn or corroded	Major
(c) Cable, rod or joint insecure	Major
(d) Cable guide defective affecting operation	Major

(e) Restriction in free movement of the braking system	Major
(f) Abnormal movement of levers indicating maladjustment or excessive wear	Major

1.1.16 Brake actuators – including spring brakes, hydraulic cylinders and callipers

Defect	Category
(a) Actuator cracked or damaged and:	
(i) braking performance not affected	Major
(ii) braking performance affected	Dangerous
(b) Actuator leaking and:	
(i) braking performance not affected	Major
(ii) braking performance affected	Dangerous
(c) Actuator insecure or inadequately mounted and:	
(i) braking performance not affected	Major
(ii) braking performance affected	Dangerous
(d) Actuator:	
(i) excessively corroded	Major
(ii) excessively corroded and likely to crack	Dangerous
(e) Actuator has:	
(i) excessive travel of operating system indicating need for adjustment	Major
(ii) no reserve travel and braking performance affected	Dangerous

1.1.17 Load sensing valve

Defect	Category
(a) Load sensing valve linkage defective	Major
(b) Load sensing valve linkage obviously incorrectly adjusted	Major
(c) Load sensing valve seized or inoperative and:	
(i) ABS functioning	Major
(ii) ABS not fitted or inoperative	Dangerous
(d) Load sensing valve missing where fitted as standard	Dangerous

1.1.18 Brake slack adjuster

Defect	Category

(a) Adjuster damaged, seized or having abnormal movement, excessive wear or incorrect adjustment	Major
(b) Adjuster defective	Major
(c) Incorrectly installed	Major

1.1.19 Endurance braking system (where fitted)

An endurance braking system, such as an exhaust brake or electronic retarder is only likely to be fitted to some large motor caravans and category M2 and M3 vehicles.

Defect	Category
(a) Endurance braking system connectors or mountings:	
(i) insecure	Minor
(ii) insecure and functionality affected	Major
(b) Endurance braking system obviously defective	Major

1.1.20 Not in use

1.1.21 Complete braking system

You must check the strength and continuity of the vehicle's load bearing members and their supporting structure or panelling around any braking component mounting.

Guidance for assessing corrosion and use of the corrosion assessment tool can be found in Appendix A.

Defect	Category
(a) Other braking system (e.g. antifreeze pump, air dryer etc.) component damaged or corroded:	
(i) to the extent that the braking system is adversely affected	Major
(ii) to the extent that braking performance is affected	Dangerous
(b) Air or antifreeze:	
(i) leaking	Minor
(ii) leaking and system functionality adversely affected	Major
(c) Any component insecure or inadequately mounted	Major
(d) Braking system component modification:	
(i) unsafe	Major
(ii) adversely affecting braking performance	Dangerous
(e) The strength or continuity of the load bearing structure within 30cm of any braking system actuation component mounting (a prescribed area):	
(i) is significantly reduced (see Appendix A)	Major

(ii)	is so weakened that the functionality of the braking system is affected	Dangerous

1.2 Service brake performance and efficiency

1.2.1 Performance

You must ensure that the vehicle is in a safe condition for the test to be carried out.

If the primary brake tester isn't suitable for the vehicle's drive configuration, transmission type or braking system, a full or partial decelerometer test may be appropriate. You should take into account any additional information from the vehicle manufacturer.

When conducting a test on an roller brake tester (RBT) where more than half of the wheels of a brake system lock the efficiency requirements for that system are considered to be met.

Alternatively, the efficiency requirements are met if the front wheels lock on the service brake of an unladen Class 7 vehicle with at least a 100kg force at each rear wheel for a two-axle vehicle, or at least 50kg force at each rear wheel on a three-axle vehicle.

Vehicles of unknown test weight can be tested on either an RBT or plate brake tester (PBT). However, if the number of wheel locks aren't achieved for any system on a non-ATL RBT, a decelerometer test must be used to establish the overall brake efficiency of the relevant system(s).

Certain converted passenger vehicles, such as motor caravans and ambulances, may have a kerb weight greatly in excess of the base model weight displayed by the MOT testing service. In these circumstances, the vehicle should be treated as having an unknown test weight.

Some tricycles with two brake controls may have a linked braking system. The brake force used in the efficiency calculation is the total from all wheels when operated by that control only.

Additional braking devices, such as electronic retarders, should not be operated during the brake test.

Using a roller brake tester

Ensure that the vehicle, or system, under test is suitable for testing using a roller brake tester. If the vehicle or system is unsuitable, it should be tested with a decelerometer.

ATL test procedure

Automated test lane (ATL) approved test stations should position the front wheels of the vehicle in the rollers of the brake tester and follow the sequence of instructions as displayed and prompted on screen. If a vehicle is ejected from the brake rollers, the required brake efforts may not be achieved. In such cases the test should be repeated in manual mode, running each roller individually.

Non - ATL test procedure

You are permitted to use an alternative procedure to that specified below as long as all the testable elements are adequately covered.

1. Position the wheels of the first axle to be tested in the brake rollers and then run both sets of rollers together in a forward direction until the vehicle is aligned. With the rollers still running, note whether a significant brake effort is recorded from any wheel without a brake being applied.
2. Gradually apply the service brake and watch how the braking effort for each wheel increases. Stopping short of lock up or maximum effort, hold a steady pedal pressure and check there is no excessive brake effort fluctuation with each revolution of the road wheel.

3. Gradually release the service brake and observe how the braking effort at each wheel reduces.
4. Gradually depress the service brake again, this time until maximum effort is achieved, or until the wheel locks and slips on the rollers. Stop the rollers.
5. Record the reading at which the maximum braking effort is achieved and whether brake “lock-up” occurs. Stop the rollers if they haven’t stopped automatically.
6. Place the wheels of the next axle in the brake rollers and repeat the above procedure.

When checking maximum effort, testers can elect to run the brake rollers individually or together, depending on the suitability of the RBT. However, if the rollers are run together and the vehicle fails to meet the minimum performance requirement, the test must be repeated running the rollers individually.

If both rollers are run together, it will almost certainly be necessary to chock the wheels that aren't being tested.

Using a plate brake tester

For vehicles other than Class 7, establish the actual presented weight of the vehicle.

For Class 7 vehicles, the brake efficiency will be calculated using one of the following:

- the actual design gross weight (DGW) where the presented weight is at least 2,000kg (the DGW is obtained from the manufacturer’s plate fitted to the vehicle)
- a nominal DGW figure of 2,600kg if the presented weight is less than 2,000kg

To use a plate brake tester:

1. Enter the appropriate data to conduct the test.
2. For each check, drive the vehicle forwards at a steady speed of about 4mph up to the plate tester.
3. On the first run, just before the wheels are on the plate high friction surfaces, apply a light constant pressure to the brake pedal. Don’t stop on the tester. Take note of the way the brake efforts fluctuate.
4. On the second run, as soon as the wheels are on the plate high friction braking surfaces, apply the service brake progressively until maximum effort is achieved.
5. Take note of the way the brake efforts increase and the maximum values achieved.

If a vehicle fails any aspect of the plate brake test, the check should be repeated to confirm the result.

Using a decelerometer

If the vehicle or system can’t be tested on a roller brake tester, set up the decelerometer in the vehicle in accordance with the equipment manufacturer’s instructions

1. Drive the vehicle on a level road at a steady speed of approximately 20mph (32kph) and progressively apply the service brake to maximum.
2. Note whether the vehicle or steering pulls severely one way and the brake efficiency recorded.

Before carrying out a decelerometer test on the public highway, testers must ensure they are suitably qualified to drive the vehicle and are familiar with the controls. If a vehicle has special controls, such as in disability vehicles, the vehicle presenter should be allowed to drive during the test if he/she wishes.

Calculating brake imbalance

For the majority of vehicles, the MOT testing service will calculate brake imbalance automatically. However, when this isn't the case, such as for tricycles and quadricycles or if MTS isn't working, you must calculate the brake imbalance against the maximum brake efforts on each axle in the following way:

$$\frac{\text{Higher brake effort - Lower brake effort}}{\text{Higher brake effort}} \text{ X 100 = \% Imbalance}$$

Disregard any brake imbalance across an axle if the lower recorded effort is as a result of a locked wheel or if the higher brake effort from a wheel isn't more than 40kg.

The check for rear axle brake imbalance does not apply to tricycles or quadricycles.

Defect	Category
(a) Braking effort:	
(i) inadequate at a wheel	Major
(ii) not recording at a wheel	Dangerous
(b) Brakes imbalance across an axle such that:	
(i) the braking effort from any wheel is less than 70% of the maximum effort recorded from the other wheel on the same axle. Or in the case of testing on the road, the vehicle deviates excessively from a straight line	Major
(ii) the braking effort from any wheel is less than 50% of the maximum effort recorded from the other wheel on a steered axle	Dangerous
(c) A brake on any wheel grabbing severely	Major
(d) Abnormal lag in brake operation on a wheel	Major
(e) Excessive fluctuation in brake effort through each wheel revolution	Major
(f) Significant brake effort recorded with no brake applied indicating a binding brake	Major
(g) Brake performance unable to be tested	Major

1.2.2 Efficiency

Calculating brake efficiency

For most vehicles the MOT testing service will calculate brake efficiencies automatically.

If MTS isn't working, add the brake efforts from each wheel for the system that is being tested and carry out the following calculation:

$$\text{\% Efficiency} = \frac{\text{Total Brake Effort}}{\text{Vehicle Test Weight}} \text{ X 100}$$

The vehicle test weight will depend on the vehicle test class.

For Classes 3 and 4 use the weight shown by the brake test equipment. Otherwise, take the weight from a weight data chart or some other reliable source.
For Class 7 use the DGW from the manufacture's plate or, the nominal DGW of 2,600kg if using a plate brake tester and the presented weight is less than 2,000kg.

1 Brakes

For Class 5 use the lesser of the DGW or maximum authorised mass (MAM) from the manufacturer's plate. On vehicles where only the ULW is displayed, you must calculate the DGW by multiplying the number of passenger seats by 63.5kg (or 140lbs) and adding the ULW, for example:
52 seats × 63.5kg = 3302kg + 5,250kg ULW = 8552kg

Efficiency requirements

For vehicle category definitions see the 'Abbreviations and definitions' in the 'Introduction'.

Vehicle type	Efficiency requirement
M1 vehicles having a service brake operating on at least 4 wheels and which were first used:	
• on or after 1 September 2010	58%
• before 1 September 2010	50%
N1 vehicles	50%
M2 and M3 vehicles having a service brake operating on at least 4 wheels which were first used:	
• on or after 1 January 1968	50%
• before 1 January 1968	45%
L2 and L6 vehicles with a single service brake control that operates the brakes on all wheels	40%
L5 vehicles with a single service brake control that operates the brakes on all wheels which were first used:	
• on or after 1 January 1968	50%
• before 1 January 1968	40%
Vehicles first used before 1 January 1968 which do NOT have one means of control operating on at least 4 wheels and which have one brake system with two means of control or two brake systems with separate means of control	30% from 1st means of control 25% from 2nd means of control
Any L category vehicle with two service brake systems each having a separate means of operation	30% from 1st means of control 25% from 2nd means of control
Vehicles first used before 1 January 1915 only require one efficient braking system	No specific requirement

Brake test results

Brake efforts achieved during a test should be entered on the MOT testing service as follows:

Roller and plate brake tests:

1. Enter the brake effort from each wheel and whether they 'lock-up'. The MOT testing service will automatically calculate the brake efficiency and out of balance results
2. Enter other defects manually.

Plate brake tests:

1. Enter the brake effort from each wheel. The MOT testing service will automatically calculate brake efficiency and out of balance results.
2. Enter other defects manually.

Decelerometer tests:

1. Enter the efficiencies recorded by the meter. The MOT testing service will automatically pass or fail the vehicle on brake efficiency.
2. Enter other defects manually.

If the MOT testing service is unavailable, refer to the latest edition of the MOT Testing Guide.

In cases where the required brake efficiency is only just met, but the tester knows that a higher performance figure is normally obtained for the vehicle type, the vehicle presenter should be informed.

Defect	Category
(a) Service brake efficiency:	
(i) below minimum requirement	Major
(ii) less than 50% of the required value	Dangerous

1.3 Secondary brake performance and efficiency

1.3.1 Performance

This inspection is only for vehicles with a single line braking system. If the secondary brake is also the park brake then there is no need to carry out a separate park brake test.

The secondary brake control may be the parking brake lever, or a separate brake control.

When testing transmission parking brakes, the minimum secondary brake efficiency requirement must be calculated before the brake is tested. As soon as the minimum efficiency requirement is reached the brake testing must cease to avoid any possible damage.

Using a roller brake tester

1. On each axle which has a secondary brake fitted, run the rollers and gradually apply the secondary brake keeping any “hold-on” button or trigger disengaged the whole time, watching how the braking effort for each wheel increases.
2. Continue to apply the parking brake until maximum effort is achieved, or until the wheels lock and slip on the rollers.
3. Record the reading at which the maximum braking effort is achieved and whether the wheels locked. Stop the rollers if they haven’t stopped automatically.

Using a plate brake tester

1. Drive the vehicle forwards at a steady speed of about 4mph up to the plate tester.

2. As soon as the wheels are on the plate high friction braking surfaces, gradually apply the secondary brake, keeping any 'hold-on' button or trigger disengaged the whole time, until maximum effort is achieved.
3. Note the way in which the brake efforts increase and the maximum values achieved.

If a vehicle fails any aspect of the plate brake test, the check should be repeated to confirm the result.

Using a decelerometer

If the vehicle or system is of a type which can't be tested on a roller brake tester, set up the decelerometer in the vehicle in accordance with the equipment manufacturer's instructions.

1. Drive the vehicle on a level road at a steady speed of approximately 20mph (32kph) and progressively apply the secondary brake to maximum.
2. Note the recorded brake efficiency.

Brake test results

For details of entering brake test results, see Section 1.2.2.

Defect	Category
(a) Braking effort:	
(i) inadequate at any wheel	Major
(ii) not recording at any wheel	Dangerous
(b) Brakes imbalance across an axle such that:	
(i) the braking effort from any wheel is less than 70% of the maximum effort recorded from the other wheel on the same axle. Or in the case of testing on the road, the vehicle deviates excessively from a straight line.	Major
(ii) the braking effort from any wheel is less than 50% of the maximum effort recorded from the other wheel on a steered axle	Dangerous
(c) A brake on any wheel grabbing severely	Major

1.3.2 Efficiency

Vehicles with a single line braking system must meet the following minimum secondary brake efficiency requirements:

Vehicle type	Efficiency requirement
M2 and M3 vehicles having a service brake operating on at least 4 wheels which were first used before 1 January 1968	20%
Vehicles first used before 1 January 1968 which do NOT have one means of control operating on at least 4 wheels and which have one brake system with two means of control or two brake systems with separate means of control	25% from 2nd means of control
All other vehicles	25%

1 Brakes

Vehicles first used before 1 January 1915 must only have one efficient braking system.

Defect	Category
(a) Parking brake efficiency:	
(i) below minimum requirement	Major
(ii) less than 50% of the required value	Dangerous

1.4 Parking brake performance and efficiency

1.4.1 Performance

You only need to inspect vehicles that haven't already had the parking brake system tested as the secondary brake.

These vehicles must instead meet the secondary brake test requirements. For details see Section 1.3.1 and 1.3.2.

When testing transmission parking brakes, the minimum parking brake efficiency requirement must be calculated before the brake is tested. As soon as the minimum efficiency requirement is reached the brake testing must cease to avoid any possible damage.

A small number of large vehicles, such as some American motor caravans, have a parking brake which isn't suitable for a dynamic brake test. In such cases a gradient test must be carried out.

Three-wheeled vehicles only require a parking brake on one wheel.

Using a roller brake tester

1. Run the rollers on each axle that has the parking brake fitted and gradually apply the parking brake, keeping any 'hold-on' button or trigger disengaged the whole time.
2. Continue to apply the brake until maximum effort is achieved, or until the wheels lock and slip on the rollers.
3. Record the reading at which the maximum braking effort is achieved and whether the wheels locked. Stop the rollers if they haven't stopped automatically.

Large vehicles fitted with spring brakes, lock actuators or air assisted parking brakes may require an applied brake test for assessing parking brake efficiency. This test must only be conducted on an approved Class 5 roller brake tester with the appropriate 'Applied Brake Test' programme.

1. Apply the parking brake fully and then release any power assistance. The service brake may be used to assist in setting the parking brake.
2. Start each brake roller in turn and note the recorded maximum effort.

Using a plate brake tester

1. Drive the vehicle forwards at a steady speed of about 4mph up to the plate tester.
2. As soon as the wheels are on the plate's high friction braking surfaces, gradually apply the parking brake, keeping any "hold-on" button or trigger disengaged the whole time, until maximum effort is achieved.

3. Note the maximum values achieved.

If a vehicle fails any aspect of the plate brake test, the check should be repeated to confirm the result.

Using a decelerometer

If the vehicle or system can't be tested on a roller brake tester, set up the decelerometer in the vehicle as instructed by the equipment manufacturer.

1. Drive the vehicle on a level road at a steady speed of approximately 20mph (32kph) and progressively apply the parking brake to maximum.
2. Note the recorded brake efficiency.

Decelerometer brake testing must always be carried out on suitable roads with as little traffic as possible. A particular public road shouldn't be used for tests so frequently that it could cause complaints from residents.

Using a gradient tester

A gradient tester can be used on vehicles that aren't suitable for a parking brake test with the primary brake tester or decelerometer.

1. Reverse the vehicle onto the 16% gradient.
2. Hold the vehicle on the service brake whilst setting the parking brake.
3. Release the service brake and note if the vehicle is held on the gradient.

Brake test results

For details of entering brake test results see Section 1.2.2.

Defect	Category
(a) Parking brake inoperative on one side, or in the case of testing on the road, the vehicle deviates excessively from a straight line	Major

1.4.2 Efficiency

You only need to inspect vehicles that haven't already had the parking brake system tested as the secondary brake.

These vehicles must instead meet the secondary brake test requirements. For details see Section 1.3.1 and 1.3.2.

For details of conducting the test see Section 1.4.1.

M2 and M3 vehicles that were first used before 1 January 1968 and that have a service brake operating on at least 4 wheels, have no specified parking brake efficiency requirement. However, they must have a parking brake that can prevent at least two wheels from turning. For vehicle category definitions see 'Abbreviations and definitions' in the 'Introduction'.

1 Brakes

Vehicles first used before 1 January 1915 only need one efficient braking system. They don't need to meet a specified efficiency requirement.

All other vehicles must achieve a minimum parking brake efficiency of 16%.

Defect	Category
(b) Parking brake efficiency:	
(i) below minimum requirement	Major
(ii) less than 50% of the required value	Dangerous

1.5 Additional braking device (retarder) performance

You must inspect any additional braking device fitted, such as an electric or fluid retarder or an exhaust brake.

It isn't necessary to drive the vehicle to carry out this inspection.

Defect	Category
(a) Control for electronic retarder does not allow gradual variation in effort	Major
(b) System obviously inoperative	Major

1.6 Anti-lock braking system (ABS)

You must inspect any ABS systems fitted.

When testing ABS equipped vehicles, the road wheels that are lifted off the ground shouldn't be allowed to rotate when the ignition is on. This can cause the ABS system to indicate a fault which may require specialist equipment to rectify.

If the ABS has been intentionally rendered inoperative, the whole system must be removed. This doesn't apply to sensor rings or other ABS components which are an integral part of another component, such as a brake disc or drive shaft.

It's not permissible to remove or disable the ABS from a vehicle first used on or after 1 January 2010.

Defect	Category
(a) Warning device not working	Major
(b) Warning device shows system malfunction	Major
(c) Wheel speed sensors missing or damaged	Major
(d) Wiring damaged	Major
(e) Other components missing or damaged	Major

1.7 Electronic braking system (EBS)

You must inspect the warning lamp operation on vehicles with an electronically controlled air braking system.

1 Brakes

Defect	Category
(a) Warning device not working	Major
(b) Warning device shows system malfunction	Major

1.8 Brake fluid

Hydraulic brake fluid level checks are confined to transparent reservoirs, reservoir caps shouldn't be removed.

Defect	Category
(a) Brake fluid contaminated	Major

2 Steering

Section 2 – Contents

2 Steering

2.1 Mechanical condition

2.1.1 Steering gear condition

To check the condition of the steering gear:

1. Put the vehicle over a pit or on a hoist and with the wheels resting on free moving turning plates – vehicles with a beam axle can be checked with the wheels raised above the ground.
2. Turn the steering from lock to lock and observe the operation of the steering gear.

Vehicles with a beam axle can alternatively be checked with the wheels raised above the ground.

If power steering is fitted, the engine must be running whilst turning the steering during these checks.

The use of turning plates isn't mandatory for Class 5 vehicles but should be used if suitable plates are available.

Defect	Category
(a) Excessive roughness in operation of steering	Major
(b) Sector shaft:	
(i) twisted or splines excessively worn	Major
(ii) twisted or splines worn to the extent that functionality is affected	Dangerous
(c) Sector shaft:	
(i) excessively worn	Major
(ii) worn to the extent that functionality is affected	Dangerous
(d) Sector shaft:	
(i) has excessive movement	Major
(ii) movement so excessive that functionality is affected	Dangerous
(e) Steering box:	
(i) leaking oil	Minor
(ii) leaking to the extent that oil is dripping	Major

2.1.2 Steering gear security

'Steering gear' refers to any steering rack, box, idler, relay or intermediate drop arm pivot housing.

To check the security of the steering gear:

1. Put the vehicle over a pit or on a hoist.
2. Make sure the front road wheels are firmly on the ground.
3. Get an assistant to rock the steering wheel in both directions against the resistance of the ground or use wheel play detectors in rotational mode.
4. Visually check the security of the 'steering gear'.
5. Check the strength and continuity of any load bearing structure within 30cm of any steering component mounting (a 'prescribed area').

2 Steering

For guidance on assessing corrosion and use of the corrosion assessment tool see Appendix A.

Defect	Category
(a) Steering gear casing:	
(i) not properly attached	Major
(ii) retaining devices dangerously loose or relative movement to chassis/bodywork visible	Dangerous
(b) Steering gear casing fixing holes in chassis:	
(i) elongated	Major
(ii) elongated to the extent that attachment is seriously affected	Dangerous
(c) Steering gear fixing bolts:	
(i) missing or ineffective	Major
(ii) missing or ineffective to the extent that attachment is seriously affected	Dangerous
(d) Steering gear casing:	
(i) fractured	Major
(ii) fractured and stability or attachment of casing affected	Dangerous
(e) The strength or continuity of the load bearing structure within 30cm of any steering component mounting (a 'prescribed area'):	
(i) is significantly reduced or inadequately repaired	Major
(ii) is so weakened that control of the vehicle is likely to be adversely affected	Dangerous

2.1.3 Steering linkage condition

To check the steering linkage condition:

1. Put the vehicle over a pit or on a hoist.
2. Make sure the front road wheels are firmly on the ground.
3. Get an assistant to rock the steering wheel in both directions against the resistance of the ground or use wheel play detectors in rotational mode.
4. Visually check the steering components for wear, fractures and security.

If power steering is fitted, the engine must be running during the tests.

The presence and effectiveness of some locking devices, such as locking fluid or 'nyloc' nuts, can't be easily determined. If you aren't certain that a locking device is missing or ineffective, you should give the benefit of the doubt.

Relative movement due to excessive wear must be distinguished from relative movement due to built-in clearance or spring loading of a joint.

Defect	Category
(a) A steering linkage component with:	
(i) relative movement between components which should be fixed	Major
(ii) excessive movement between components or likely to become detached	Dangerous

(b) A steering ball joint:	
(i) with excessive wear or free play	Major
(ii) worn to the extent there is a serious risk of detachment	Dangerous
(c) A steering linkage component:	
(i) fractured or deformed	Major
(ii) fractured or deformed to the extent that steering is affected	Dangerous
(d) Steering linkage retaining or locking device missing or ineffective	Major
(e) Track rod or drag link ends seriously misaligned	Major
(f) A steering linkage component:	
(i) with an unsafe modification	Major
(ii) modified to the extent that steering is affected	Dangerous
(g) Steering rack gaiter or ball joint dust cover:	
(i) damaged or deteriorated	Minor
(ii) missing or no longer prevents the ingress of dirt etc.	Major

2.1.4 Steering linkage operation

To check the steering linkage operation:

1. Put the vehicle over a pit or on a hoist.
2. Put the wheels on free moving turning plates.
3. If the vehicle has power steering, turn on the engine.
4. Rotate the steering from lock to lock.
5. Check the steering linkage isn’t fouling any part of the vehicle.
6. If there's a steering lock stop, check that it works.

A missing steering lock stop should only be failed if it was fitted as standard.

Defect	Category
(a) Steering linkage fouling any part of the vehicle	Major
(b) Steering lock-stop missing or incorrectly adjusted	Major

2.1.5 Power steering

If power steering isn't working, you may have to do a road test to check if the steering is adversely affected.

Power steering fluid level should be checked through any sight glass, the cap shouldn’t be removed.

Power steering fluid leaks should only be rejected where a component, joint or seal has failed.

Defect	Category
(a) Power steering fluid leaking or system malfunctioning	Major
(b) Power steering fluid:	

(i) level below minimum mark	Minor
(ii) reservoir empty	Major
(c) Power steering:	
(i) inoperative	Major
(ii) inoperative and steering adversely affected	Dangerous
(d) Power steering component:	
(i) fractured or insecure	Major
(ii) fractured or insecure and steering adversely affected	Dangerous
(e) Power steering component:	
(i) fouling or misaligned	Major
(ii) fouling or misaligned and steering adversely affected	Dangerous
(f) Power steering component:	
(i) with an unsafe modification	Major
(ii) modified and steering adversely affected	Dangerous
(g) Power steering pipe, hose or wiring:	
(i) excessively damaged or corroded	Major
(ii) damaged or corroded and steering adversely affected	Dangerous

2.2 Steering wheel and column or handlebar, forks and yokes

2.2.1 Steering wheel or handlebar condition

Before carrying out this inspection, make sure that any mechanism for adjusting the steering column is fully locked. Exert only reasonable pressure on the steering wheel, particularly when the steering column is collapsible.

Push and pull the steering wheel or handlebar in line with the column or forks to check it's properly secured.

Defect	Category
(a) Relative movement between steering wheel and column:	
(i) indicating looseness	Major
(ii) such that there is a serious risk of detachment	Dangerous
(b) Steering wheel:	
(i) retaining device missing	Major
(ii) likely to become detached	Dangerous
(c) Steering wheel rim or spokes:	
(i) fractured or loose	Major
(ii) likely to become detached	Dangerous
(d) Handlebar:	

(i) fractured or insecure	Major
(ii) fractured or insecure to the extent that steering is adversely affected or detachment likely	Dangerous
(e) Handlebar:	
(i) excessively deformed or corroded	Major
(ii) deformed or corroded to the extent that steering is adversely affected or failure likely	Dangerous
(f) Handlebar handgrips:	
(i) missing	Major
(ii) insecure to handlebar	Dangerous

2.2.2 Steering column or forks and yokes

Before carrying out this inspection, make sure that any mechanism for adjusting the steering column is fully locked. Exert only reasonable pressure on the steering wheel, particularly when the steering column is collapsible.

Some vehicles have flexible top bearings for the steering column which may have more than average movement.

Steering columns with universal joints or flexible couplings may show some movement which isn't due to excessive wear or deterioration.

To check the steering column or forks and yokes:

1. Push and pull the steering wheel in line with column.
2. Push steering wheel or handle bar in various directions at right angles to the column or forks.
3. Check visually for play.
4. Check the condition of flexible couplings or universal joints.

Defect	Category
(a) Excessive movement of centre of steering wheel up or down	Major
(b) Excessive radial movement between the top of the steering column and the shaft indicating an excessively worn top bearing	Major
(c) Excessive deterioration of a flexible coupling	Major
(d) Attachment of steering column:	
(i) defective	Major
(ii) defective to the extent that there is a serious risk of detachment	Dangerous
(e) Unsafe modification to steering column, forks or fork yoke	Major
(f) Forks or fork yoke:	
(i) deformed, fractured or insecure	Major
(ii) in such a condition that steering control is adversely affected or detachment likely	Dangerous

(g) Steering head bearings have excessive wear or play	Major

2.3 Steering play

To check steering play:

1. Make sure the road wheels are on the ground and pointing straight ahead.
2. Lightly turn the steering wheel left and right as far as possible without moving the road wheels.
3. Check the amount of free play at the rim of the steering wheel.

If power steering is fitted, the engine must be running.

Steering wheel free play shouldn't be more than:

- 13mm for rack and pinion steering, or 48mm if there are several joints between the steering wheel and the rack
- 75mm for non-rack and pinion

These limits are for a standard 380mm diameter steering wheel. The limits should be adjusted up or down accordingly with larger or smaller diameter steering wheels.

Play due to wear or maladjustment mustn't be confused with apparent play due to the construction of the mechanism, such as caused by the deflection of flexible joints or spring compression in external power steering systems.

Defect	Category
(a) Free play in the steering, measured at the rim of the steering wheel is:	
(i) excessive	Major
(ii) excessive to the extent that safe steering is affected	Dangerous

2.4 Not in use

2.5 Not in use

2.6 Electronic power steering (EPS)

If electronic power steering is an optional fitment on the vehicle but it's been disconnected, the vehicle should only be failed if the steering is adversely affected. You may have to do a road test to check this.

If a vehicle has a manually switched electronic park assist but the power assistance isn't working, the vehicle should only be failed if the steering is adversely affected. You may have to do a road test to check this.

For 'fly by wire' steering systems, check that the steered wheels are pointing straight ahead with the steering wheel in the straight ahead position.

Defect	Category

2 Steering

(a) EPS MIL indicating a system malfunction	Major
(b) On 'fly by wire systems', the angle of the steering wheel and the angle of the road wheels is:	
(i) inconsistent	Major
(ii) inconsistent to the extent that the steering is adversely affected	Dangerous
(c) Electronic power assistance not working	Major

3 Visibility

Section 3 – Contents

3 Visibility

3.1 Field of vision

You must inspect all windscreens, including windscreens that open.

How to inspect:

1. Sit in the driver's seat.
2. Check the driver’s field of vision through the windscreen.
3. Check the driver’s field of vision through the front side windows.

You should only fail the windscreen if the view is significantly affected. If only the driver’s view of the sky or the bonnet is affected, it shouldn’t be rejected.

You don’t need to consider how the field of vision would be affected by tall or short drivers

The following are only considered a defect if they seriously restrict the driver's view:

- taxi signs to indicate when the vehicle is ‘for hire’
- ‘official’ stickers, such as parking and disabled permits
- sun visor on the driver's side that can’t be stowed in the 'off screen' position
- windscreen wipers that automatically stop in a position obscuring the view

You can remove items such as a sat nav or air fresheners that obstruct the driver's view of the road. However, make sure you tell the driver.

You must inspect bonnet catches on vehicles with a bonnet, which would obscure the driver’s view of the road if opened. The inspection is only for primary catches – those that hold the bonnet fully closed. Secondary safety catches aren't part of the inspection.

You must accept manufacturer’s original design characteristics, such as:

- opaque edging
- split windscreens
- modifications to security type vehicles, for example additional windscreen protection and strengthening supports

Additional interior mirrors and externally mounted items such as mascots and spare wheels aren't part of the test.

Defect	Category
(a) An obstruction:	
(i) within the driver’s field of view that materially affects his view in front or to the sides outside the swept area of windscreen	Minor
(ii) materially affecting the driver’s view of the road through the swept area of the windscreen or an obligatory external mirror not visible	Major
(b) A bonnet:	

3 Visibility

(i) which cannot be safely secured in the closed position (ii) seriously at risk of opening inadvertently	Major Dangerous
(c) A bonnet primary retaining device excessively deteriorated, ineffective or insecure.	Major

3.2 Condition of glass

You must check the condition of:

- the windscreen
- windows on either side of the driver's seat

To inspect the condition of glass:

1. Sit in the driver's seat.
2. Check the view of the road.
3. Check the view of mandatory external mirrors.

Check for:

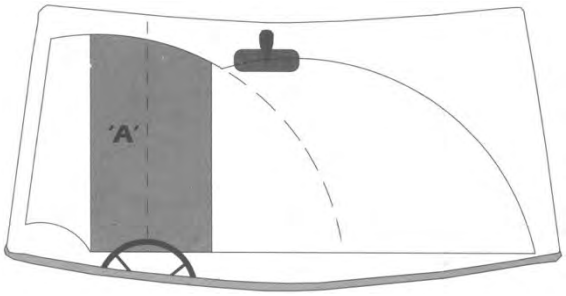
- damage in windscreen zone A more than 10mm in diameter
- damage in the remainder of the windscreen's swept area more than 40mm in diameter
- damage to windows on either side of the driver's seat
- excessive tinting or discolouration of the windscreen or windows on either side of the driver's seat

Failure for damage is only justified if the damage significantly affects the driver's view of the road. You don't need to consider the effects on tall or short drivers.

Failure for tinting or discolouration is only justified if the driver's view is significantly affected.

Zone A is:

- in the swept area of the windscreen
- 290mm wide
- centred on the steering wheel



3 Visibility

Repaired windscreens must be judged solely on whether the repair interferes with vision. An 'invisible' or barely detectable repair, finished flush with the surrounding glass, doesn't count as damage.

Class 5 glazing

Vehicles first used from 1 June 1978 must have:

- windscreens and windows on either side of the driver's seat made from safety glass
- all other windows made from safety glass or safety glazing

Safety glass can be identified by one of the following markings:

- BS 857
- BS 5282 – but not acceptable on vehicles first used on or after 1 April 1985
- TP GS or TP GSE – but not acceptable on vehicles first used on or after 1 October 1986
- BS AU 178
- an 'E' mark (including the number 43R)
- an 'e' mark followed by a number, such as e11, inside a square

Safety glazing means material other than glass constructed or treated not fly into fragments that would cause severe cuts if it's fractured. There is no marking requirement for safety glazing.

Defect	Category
(a) Windscreen or window damaged or seriously discoloured:	
(i) but not adversely affecting driver's view	Minor
(ii) and affecting the driver's view of the road or of an obligatory external mirror	Major
(b) Windscreen or window excessively tinted:	
(i) but not adversely affecting driver's view	Minor
(ii) and visibility through swept area of windscreen or of an obligatory external mirror seriously affected	Major
(c) Windscreen or window:	
(i) in an unacceptable condition e.g. due to excessive scratching	Major
(ii) in such a condition that visibility through swept area is seriously affected	Dangerous
(d) The windscreen or a window wholly or partly on either side of the driver's seat is not made from safety glass	Major
(e) A window not wholly or partly on either side of the driver's seat is not made from safety glass or safety glazing	Major

3.3 View to rear

You must check that all mandatory rear-view mirrors or indirect vision devices provide an adequate view to the rear from the driver's seat.

3 Visibility

You don't need to adjust mirrors or devices for this check.

Indirect vision cameras may replace mirrors on some vehicles. If such devices are fitted, you must inspect the camera(s) and the screen.

Rear view mirrors and indirect vision devices can be any of the following positions:

a. an exterior mirror or device that provides a view along the offside of the vehicle
b. an exterior mirror or device that provides a view along the nearside of the vehicle
c. an interior mirror or device which provides a view to the rear of the vehicle

Mandatory mirror or device fitment positions

Vehicle Type	Date of First Use	Requirements
Passenger vehicles with less than 8 passenger seats	First used before 1 August 1978	At least one mirror/device in any of the above positions
Passenger vehicles with 8 or more passenger seats (excluding buses and minibuses)	Any age	2 mirrors/devices, one of which must be in position ‘a’.
Goods vehicles	Any age	2 mirrors/devices, one of which must be in position ‘a’.
Buses and minibuses	First used before 1 August 1983	2 mirrors/devices, one of which must be in position ‘a’.
Buses and minibuses	First used on or after 1 August 1983	An exterior mirror/device fitted on both the offside and the nearside (‘a’ and ‘b’).

Defect	Category
(a) Obligatory mirror or device missing.	Major
(b) Obligatory mirror or device:	
(i) slightly damaged or loose	Minor
(ii) inoperative, excessively damaged or insecure	Major
(c) Obligatory mirror or device not providing an adequate view to the rear	Major

3.4 Windscreen wipers

You don't need to inspect windscreen wipers on vehicles with:

- an opening windscreen
- some other means of giving the driver an adequate view through the windscreen to the front, left and right

You only need to reject a windscreen wiper if it's clearly damaged or worn.

Defect	Category

3 Visibility

(a) Wiper not operating or missing	Major
(b) Wiper blade:	
(i) defective	Minor
(ii) missing or obviously not clearing the windscreen	Major

3.5 Windscreen washers

You don't need to inspect windscreen wipers on vehicles with:

- an opening windscreen
- some other means of providing the driver with an adequate view through the windscreen to the front, left and right

Washers must provide enough fluid for the wipers to clear the windscreen effectively.

Defect	Category
(a) Windscreen washers not working or not providing sufficient fluid to clear the windscreen	Major

4 Lamps, reflectors and electrical equipment

Section 4 – Contents

4 Lamps, reflectors and electrical equipment

4.13 Battery(ies)

4 Lamps, reflectors and electrical equipment

4.1 Headlamps

4.1.1 Presence, condition and operation

You must test all mandatory headlamps.

'Mandatory headlamps' are a matched pair of main beam headlamps and a matched pair of dipped-beam headlamps. These can be separate or a single pair of headlamps.
Lamps are matched if they:

- emit light of substantially the same colour and intensity
- are the same size and shape that they are symmetrical to each other

You don't need to test headlamps on vehicles if:

- they're not fitted with front or rear position lamps
- they have front or rear position lamps that are permanently disconnected, painted over or masked

Vehicles first used before 1 January 1931 don't need headlamps.

Buses first used before 1 October 1969 only need one headlamp. If 2 are fitted, neither the main beam or dipped beams need to be a matched pair.

Repairs to lamps must be assessed for security, colour, light output, durability and beam aim.

Tricycle and quadricycle headlamps must be:

- mounted centrally – if there's only one lamp
- mounted symmetrically about the centre – if they're adjacent to another lamp, such as there's one dipped beam lamp and one main beam lamp
- mounted symmetrically – if there's 2 lamps

The following must have a pair of main beam headlamps and a pair of dipped beam headlamps – can be separate or a single pair of headlamps:

- tricycles and quadricycles with a maximum width over 1,300mm
- motorcycle derived tricycles with a maximum width over 1,700mm

Tricycles and quadricycles classed as mopeds don't need a main beam headlamp.

A 'light source' means any bulb, LED or other means of emitting light.

Defect	Category
(a) A headlamp:	
(i) with up to ½ light sources not functioning in the case of LED	Minor
(ii) missing, inoperative or more than ½ not functioning in the case of LED	Major
(b) Headlamp reflector or lens:	
(i) slightly defective	Minor
(ii) seriously defective or missing	Major

(c) Lamp not securely attached	Major

4.1.2 Headlamp alignment

You must inspect all dipped beam headlamps fitted.

The type of headlamp will determine whether the aim must be checked on dipped or main beam (see Diagrams 1, 2 and 3).

A flat top or other alternative headlamp dipped beam pattern is acceptable as long as all of the beam upper edge, including any ‘peak’ is contained within the appropriate tolerance band.

It's acceptable for masks or converter kits to be fitted to right hand dip headlamps to temporarily alter the lamp for use in the UK by removing the beam ‘kick-up’ to the right.

If driver’s beam aim controls are fitted, you should test the beam aim without altering the control setting. If this would result in failure for beam aim being too low, you should re-check the beam aim with the control set at its ‘highest’ position.

On vehicles with hydro-pneumatic suspension systems, it's necessary to have the engine running when checking headlamp aim.

To check the aim:

1. Position the vehicle on the designated headlamp aim standing area.
2. Align the headlamp aim testing equipment to the vehicle in accordance with the manufacturer’s instructions.
3. Determine the appropriate headlamp beam image and its aim (see Diagrams 1, 2 and 3).

For complex lens systems – meaning those that have more than one lamp behind a single lens – make sure the test equipment is aligned exactly on the centre of the dipped beam pocket.

You mustn’t carry out repairs during an MOT test, but you can make minor adjustments to the headlamp aim.

European type – check on dipped beam

European type lamps have one of the following:

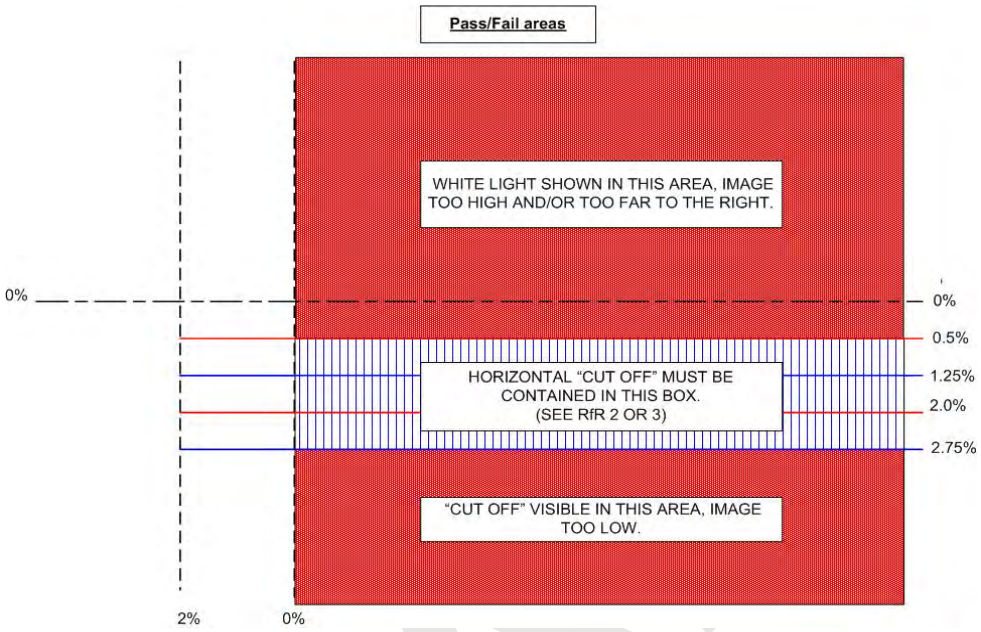
- an asymmetric dipped beam pattern with
  - a horizontal cut-off on the right
  - a wedge of light above the horizontal towards the left, known as the 'kick up'
- lens may have European approval mark

For European type lamp to pass, you must make sure that:

- beam image 'kick up' is visible on the screen
- for headlamps with centres at 850mm or less from the ground, the beam image horizontal cut-off is between the 0.5% and 2.75% horizontal lines
- for headlamps with centres more than 850mm from the ground, the beam image horizontal cut-off is between the 1.25% and 2.75% horizontal lines

- white light doesn't show in the zone formed by the 0% vertical and 0.5% horizontal line

Diagram 1. Aim information



British American headlamp – check on main beam

British American type headlamps are checked on main beam if they have an asymmetric main beam pattern with a central area of maximum intensity, known as a ‘hot spot’.

The generally also have a circular lens marked with a figure ‘1’ followed by an arrow indicating the direction of dip.

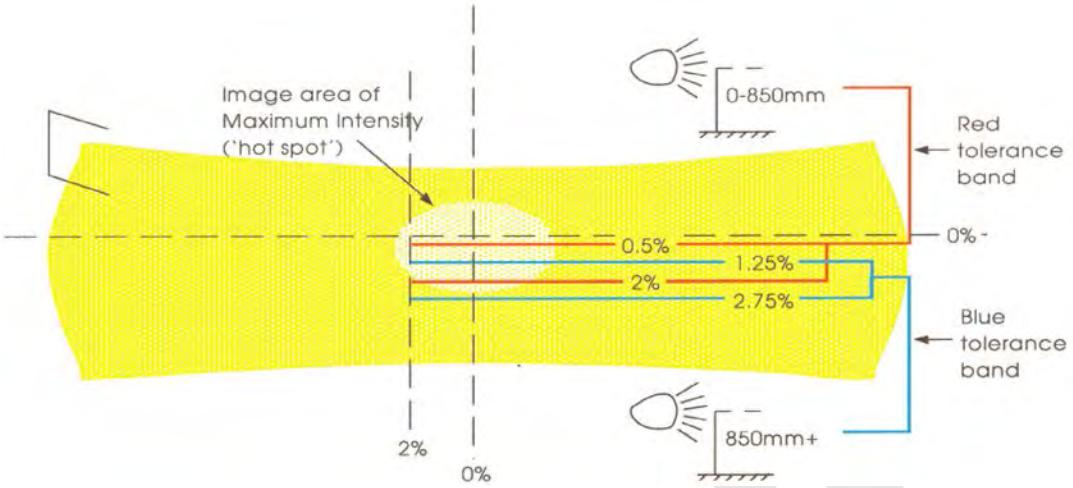
You must fail a British American type lamp if the 'hot spot' is:

- above the horizontal 0% line
- below the horizontal 2% line for headlamps with centres at 850mm or less from the ground
- below the horizontal 2.75% line for headlamps with centres more than 850mm from the ground
- to the right of the vertical 0% line
- to the left of the vertical 2% line

For a British American type lamp to pass, you must also make sure the brightest part of the image moves downwards when the lamp is dipped.

Diagram 2. Main beam image

4 Lamps, reflectors and electrical equipment



British American headlamp – check on dipped beam

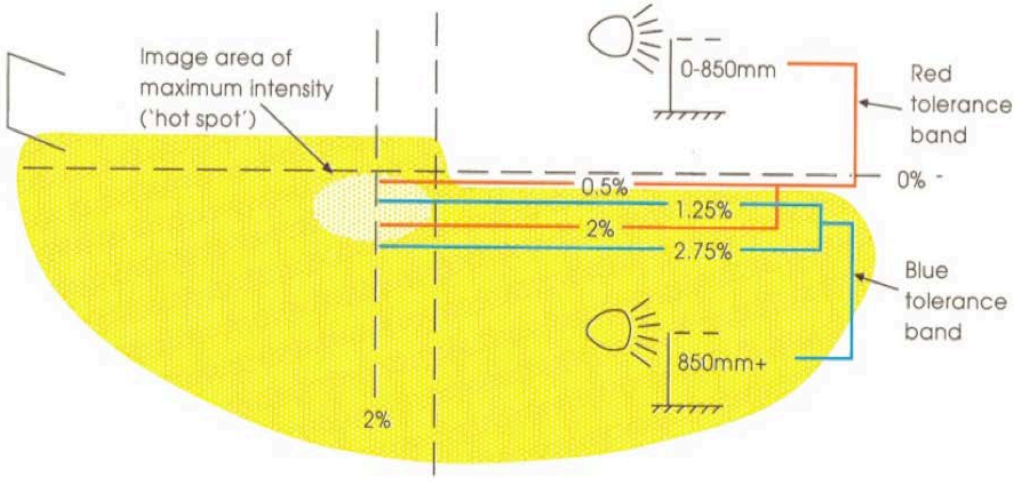
Check British American headlamps on dipped beam if they have:

- an asymmetric dipped beam pattern with a flat-topped area of high intensity extending above and parallel with the horizontal 0% line on the nearside
- a circular lens marked with the figure 2 – it might also have an arrow showing the direction of dip

You must fail this lamp if the 'hot spot':

- upper edge is above the horizontal 0% line
- upper edge is below the horizontal 2.75% line
- right-hand edge is to the right of the vertical 0% line
- right-hand edge is to the left of the vertical 2% line

Diagram 3. Dipped beam image



Defect	Category

(a) The aim of a headlamp is not within limits laid down in the requirements	Major
(b) Headlamp aim unable to be tested	Major

4.1.3 Switching

Dipped or main beam headlamps must immediately light up when they're switched on (depending on the position of the dip switch).

Headlamps must switch immediately between main beam and dipped beam when you move the dip switch.

Moving the dip switch must do one of the following:

- extinguish all main beam headlamps and leave on at least one pair of dipped-beam headlamps
- deflect the main beams to make them dipped beams

Dipped beam headlamps can remain on or switch off when main beam is selected.

Headlamps aren't needed on vehicles first used before 1 January 1931.

When optional headlamps are fitted:

- if one is fitted it must dip
- if 2 are fitted, either both must dip or one must dip and the other switch off

Defect	Category
(a) Headlamp ‘on’ switch does not operate in accordance with the requirements	Minor
(b) Headlamp ‘dip’ switch does not operate in accordance with the requirements	Major

4.1.4 Compliance with requirements

You must inspect all 'mandatory' headlamps fitted.

Mandatory headlamps consist of a matched pair of main beam headlamps and a matched pair of dipped-beam headlamps. These can be separate or a single pair of headlamps.
Lamps are matched if they:

- emit light of substantially the same colour and intensity
- are the same size and shape that they are symmetrical to each other

Vehicles first used before 1 January 1931 don't need headlamps.

Buses first used before 1 October 1969 only need one headlamp. If 2 are fitted, neither the main beam or dipped beams need to form matched pair.

The colour of the light headlamps emit must be one of the following:

- white
- predominantly white with blue tinge
- yellow

In a four-headlamp system the outer headlamps don't need to emit the same colour light as the inner pair.

The precise position of lamps isn't part of the inspection, but you should check visually that they are at about the same height and the same distance from each side of the vehicle.

Existing halogen headlamp units shouldn't be converted to be used with HID bulbs. If such a conversion has been done, you must fail the headlamp.

Tricycle and quadricycle headlamps must be:

- mounted centrally – if there's only one lamp
- mounted symmetrically about the centre – if they're adjacent to another lamp, such as there's one dipped beam lamp and one main beam lamp
- mounted symmetrically – if there's 2 lamps

The following must have a pair of main beam headlamps and a pair of dipped beam headlamps – can be separate or a single pair of headlamps:

- tricycles and quadricycles with a maximum width over 1,300mm
- motorcycle derived tricycles with a maximum width over 1,700mm

Tricycles and quadricycles classed as mopeds don't need main beam headlamps.

A 'light source' means any bulb, LED or other means of emitting light.

Repairs to lamps must be assessed for security, colour, light output and durability.

Defect	Category
(a) Headlamp emitted colour, position or intensity not in accordance with the requirements	Major
(b) Product on the lens or light source which obviously reduces light intensity or changes emitted colour to other than white or yellow	Major
(c) Light source and lamp not compatible	Major

4.1.5 Levelling devices

Make sure any manual headlamp levelling devices (driver controls) work by:

- switching on the dipped beam headlamps
- operating the manual levelling device
- checking that the headlamp beams move up and down
- returning the levelling device control to its original position

Vehicles with high intensity discharge (HID) or LED dipped beam headlamps may be fitted with a suspension or headlamp self-levelling system. If these systems have been fitted, they must work.

Sometimes it isn't easy to determine if the self-levelling systems work. In such cases you should give the benefit of the doubt.

You can identify HID headlamps from:

- 'DCR' mark on the headlamp lens or body
- an igniter module or inverter behind the headlamp
- taking a few seconds to reach full intensity
- a bluish tinge to the light

HID headlamps use high voltage. You should take care when inspecting these headlamps.

Defect	Category
(a) Headlamp levelling device inoperative	Major
(b) Manual levelling device cannot be operated from the driver's seat	Major

4.1.6 Headlamp cleaning devices

You must inspect vehicles first used on or after 1 September 2009 equipped with headlamp washers.

You can identify HID headlamps from:

- 'DCR' mark on the headlamp lens or body
- an igniter module or inverter behind the headlamp
- taking a few seconds to reach full intensity
- a bluish tinge to the light

HID headlamps use high voltage. You should take care when inspecting these headlamps.

Defect	Category
(a) Headlamp cleaning device:	
(i) inoperative	Minor
(ii) inoperative in the case of LED or gas discharge systems (HID)	Major

4.2 Front and rear position lamps, side marker lamps and end-outline marker lamps

4.2.1 Presence, condition and operation

This inspection is for:

- mandatory position lamps
- mandatory end-outline marker lamps
- daytime running lamps (DRLs) fitted to M1 vehicles first used on or after 1 March 2018

Vehicles don't need to be fitted with position lamps, or they can have such lamps permanently disconnected, painted over or masked. In this situation you should issue an advisory notice. These vehicles don't need end-outline marker lamps.

4 Lamps, reflectors and electrical equipment

All lamps

Repairs to lamps must be assessed for security, colour, light output and durability.

Front and rear position lamps

Vehicles must have 2 front and 2 rear position lamps, except for tricycles or quadricycles that are less than 1,300mm wide.

Daytime running lamps (DRLs) or headlamps may function as front position lamps. If the DRLs function as front position lamps, they should dim when rear position lamps are switched on and may turn off when headlamps are switched on.

Front position lamps can switch off when the front fog lamps are switched on.

The front and rear position lamps must light up at the same time with the registration plate lamps and end-outline marker lamps.

Tricycles and quadricycles less than 1,300mm wide must have at least one front and one rear position lamp. However, if the maximum vehicle width is more than 1,300mm, it must have 2 front and 2 rear position lamps.

Tricycle and quadricycle lamps must be:

- mounted centrally – if there's one lamp
- mounted symmetrically – if there's 2 lamps
- mounted symmetrically about the centre – if there's a single front position lamp next to another front lamp, such as a headlamp

Buses first used before 1 April 1955 only need one rear position lamp. The lamp must be on the centre line or to the offside.

End-outline marker lamps

You must inspect end-outline marker lamps on vehicles first used on or after 1 April 1991 that are wider than 2,100mm.

Class 3 vehicles don't need end-outline marker lamps.

The front and rear end outline marker lamps on each side can be combined in one lamp.

Daytime running lamps

You only need to inspect daytime running lamps (DRLs) if they're fitted as original equipment to vehicles first used on or after 1 March 2018.

Defect	Category
(a) A lamp missing or inoperative.	Major
(b) Defective lens.	Major
(c) Lamp:	

(i)	not securely attached	Minor
(ii)	likely to become detached	Major

4.2.2 Switching

It must be possible to switch on the position lamps from the driver's seat with a single operation of the switch. The position lamps must light up at the same time as the registration plate lamps and any end-outline marker lamps where they are fitted.

Some vehicles have position lamps that come on automatically when the engine is running.

Daytime running lamps (DRLs) or headlamps may function as front position lamps. If the DRLs function as front position lamps, they should dim when rear position lamps are switched on and may turn off when headlamps are switched on.

The front position lamps may turn off when the headlamps or front fog lamps are switched on.

If position lamps are combined with direction indicators, position lamps should switch off when the relevant direction indicator is flashing.

The front and rear position lamps must light up at the same time with the end-outline marker lamps where they are fitted.

You only need to inspect daytime running lamps (DRLs) if they're fitted as original equipment to vehicles first used on or after 1 March 2018.

DRLs must switch on and off when the engine is switched on and off.

DRLs might not operate when:

- the parking brake is on
- the park position is selected on automatic transmissions

If DRLs have been manually switched off, sometimes they don't light up until the vehicle is travelling faster than 10 kilometres per hour (6.2mph) or the vehicle has travelled 100m (328ft).

Defect	Category
(a) Switch does not operate in accordance with the requirements or the rear position lamps can be switched off when the headlamps are on	Major
(b) Function of the switch impaired	Major

4.2.3 Compliance with requirements

You must inspect:

- mandatory position lamps
- mandatory end-outline marker lamps
- daytime running lamps (DRLs) fitted to M1 vehicles first used on or after 1 March 2018

All lamps

4 Lamps, reflectors and electrical equipment

The precise position of lamps isn't part of the inspection. You should check visually that they are at about the same height and distance from each side of the vehicle.

A 'light source' means any bulb, LED or other means of emitting light.

You must assess repairs to lamps for security, colour, light output and durability.

Position lamps

Rear position lamps must emit a steady red light.

For front position lamps, the following colour of light is acceptable:

- white light
- predominantly white light with a blue tinge
- yellow light – if combined in a yellow headlamp

If position lamps are combined with direction indicators, the position lamps should switch off when the relevant direction indicator is flashing.

End-outline marker lamps

Vehicles first used on or after 1 April 1991 that are wider than 2,100mm must have their end-outline marker lamps inspected.

Class 3 vehicles don't need end-outline marker lamps.

There must be:

- 2 white lamps visible from the front and positioned at windscreen upper edge level or higher
- 2 red lamps visible from the rear and positioned as high as is practicable

The front and rear end outline marker lamps on each side can be combined in one lamp.

Daytime running lamps

You only need to inspect daytime running lamps (DRLs) fitted as original equipment to vehicles first used on or after 1 March 2018.

There mustn't be more than 2 DRLs fitted and they must emit white light.

DRLs might not operate when:

- the engine isn't running
- the parking brake is on
- the park position is selected on automatic vehicles

If DRLs have been manually switched off, sometimes they don't light up until the vehicle is travelling faster than 10km/h (6.2mph) or the vehicle has travelled 100m (328ft).

Defect	Category

(a) Lamp:	
(i) emitted colour, position or intensity not in accordance with the requirements	Minor
(ii) showing red light to the front, white light to the rear or has heavily reduced light intensity	Major
(b) A lamp with a product on the lens or light source:	
(i) which obviously reduces light intensity or changes emitted colour	Minor
(ii) which shows red light to the front, white light to the rear or has heavily reduced light intensity	Major

4.3 Stop lamps

4.3.1 Presence, condition and operation

You must inspect all stop lamps fitted.

Stop lamps must show a steady red light.

Stop lamps aren't needed for vehicles that:

- don't have front and rear position lamps
- have front and rear position lamps that are permanently disconnected, painted over or masked
- were first used before 1 January 1936

Vehicles first used on or after 1 January 1971 must have 2 stop lamps, one on each side.

Vehicles first used before 1 January 1971 may be fitted with only 1 stop lamp, which can be mounted centrally or towards the offside.

Additional stop lamps, over and above the mandatory requirements, must be tested. However, if you aren't sure if they are connected, you should give the benefit of the doubt.

A ‘light source’ means any bulb, LED or other means of emitting light.

You must assess repairs to lamps for security, colour, light output and durability.

Tricycles and quadricycles:

- not wider than 1,300mm can have only one stop lamp
- with 2 service brake controls – both controls must operate the stop lamp(s)
- with 2 stop lamps – must be mounted symmetrically
- with 1 stop lamp – must be mounted centrally

Defect	Category
(a) Stop lamp(s):	
(i) with a multiple light source up to 1/2 not functioning	Minor
(ii) missing, inoperative or in the case of a multiple light source more than 1/2 not functioning	Major
(iii) all missing or inoperative	Dangerous
(b) A lens defective:	

(i) which has no effect on emitted light	Minor
(ii) such that the emitted light is adversely affected	Major
(c) A stop lamp:	
(i) not securely attached	Minor
(ii) likely to become detached	Major

4.3.2 Switching

All stop lamps must light up immediately when the brake is applied and switch off immediately when the brake is released.

Vehicles first used on or after 1 January 1971 must have 2 stop lamps, one on each side.

Vehicles first used before 1 January 1971 can be fitted with only 1 stop lamp. The lamp can be mounted centrally or towards the offside.

Additional stop lamps, over and above the mandatory requirements, must be tested. However, if you aren't sure that they're connected, you should give the benefit of the doubt.

Vehicles first used before 1 September 1965 may have a stop lamp combined with a direction indicator lamp.

Tricycles and quadricycles:

- not wider than 1,300mm can have only one stop lamp
- with 2 service brake controls - both controls must operate the stop lamp(s)
- with 2 stop lamps - must be mounted symmetrically
- with 1 stop lamp - must be mounted centrally

Defect	Category
(a) Stop lamp(s):	
(i) switch does not operate in accordance with the requirements	Minor
(ii) switch with a delay in operation	Major
(iii) remain on when the brakes are released	Dangerous

4.3.3 Compliance with requirements

You must inspect all stop lamps.

Stop lamps aren’t needed for vehicles that:

- don't have front and rear position lamps
- have front and rear position lamps permanently disconnected, painted over or masked
- were first used before 1 January 1936

Vehicles first used on or after 1 January 1971 must have 2 stop lamps, one on each side.

Vehicles first used before 1 January 1971 can be fitted with only one stop lamp. The lamp can be mounted centrally or towards the offside.

Additional stop lamps, over and above the obligatory requirements, must be tested. However, if you aren't sure that they're connected, you should give the benefit of the doubt.

You must assess repairs to lamps for security, colour, light output and durability.

Tricycles and quadricycles**:**

- not wider than 1,300mm can have only one stop lamp
- with 2 service brake controls – both controls must operate the stop lamp(s)
- with 2 stop lamps – must be mounted symmetrically
- with 1 stop lamp – must be mounted centrally

Defect	Category
(a) A stop lamp:	
(i) emitted colour, position or intensity not in accordance with the requirements	Minor
(ii) showing white light to the rear or significantly reduced light intensity	Major

4.4 Direction indicators and hazard warning lamps

4.4.1 Presence, condition and operation

You must inspect all direction indicators and hazard warning lamps.

Direction indicators and hazard warning lamps aren’t needed for vehicles that:

- don't have front and rear position lamps
- have front and rear position lamps that are permanently disconnected, painted over or masked
- were first used before 1 January 1936

Direction indicators must be amber.

Vehicles first used before 1 September 1965 may have white front indicators and red rear indicators, if the direction indicators are combined with stop lamps or combined with front or rear position lamps.

Vehicles first used before 1 April 1986 don’t need to have hazard warning devices.

Vehicles first used on or after 1 April 1986 must be fitted with an amber side repeater indicator on each side.

The side repeater can be part of the front direction indicator if it has one of the following:

- a wraparound lens marked either with an ‘E’ mark in a circle or an ‘e’ mark in a rectangle with a number 5 above it
- an amber light coming through the front lens when viewed from 1m to the side of the rear bumper

Semaphore arms may flash but don't need to.

A ‘light source’ means any bulb, LED or other means of emitting light.

You must assess repairs to lamps for security, colour, light output and durability.

Tricycles and quadricycles classed as mopeds don't need hazard warning lamps. Only 'bodied' mopeds must have direction indicators.

Defect	Category
(a) A direction indicator:	
(i) lamp with a multiple light source up to 1/2 not functioning	Minor
(ii) lamp missing, inoperative or in the case of a multiple light source more than 1/2 not functioning	Major
(b) A lens defective:	
(i) which has no effect on emitted light	Minor
(ii) such that the emitted light is adversely affected	Major
(c) A lamp:	
(i) not securely attached	Minor
(ii) likely to become detached	Major

4.4.2 Switching

Hazard warning lamps must operate using only one switch and with the engine or ignition switch in both the on and off positions.
For tricycles and quadricycles, hazard warning lamps must work both with the engine running and switched off. This may be by use of an engine kill switch or by turning the ignition off.

Defect	Category
(a) Indicator or hazard warning switch:	
(i) does not operate in accordance with the requirements	Minor
(ii) inoperative	Major

4.4.3 Compliance with requirements

Direction indicators must be amber.

Vehicles first used before 1 September 1965 may have white front indicators and red rear indicators, if the direction indicators are combined with stop lamps or combined with front or rear position lamps.

On vehicles first used on or after 1 September 1965 with direction indicators combined with position lamps, the position lamp must go out when its direction indicator is flashing. The direction indicator must flash amber only, with no white or red light.

A semaphore arm must light up when switched on, but it doesn’t need to flash.

The precise position of lamps isn’t part of the inspection. You should check visually that they are at about the same height and distance from each side of the vehicle.

You must assess repairs to lamps for security, colour, light output and durability.

Defect	Category

(a) Lamp emitted colour, position or intensity not in accordance with the requirements	Major

4.4.4 Flashing frequency

Indicators must flash at between 60 and 120 times per minute. Semaphore type direction indicators don't need to flash.

Defect	Category
(a) Rate of flashing not between 60 and 120 times per minute	Minor

4.5 Front and rear fog lamps

4.5.1 Presence, condition and operation

You only need to inspect:

- front fog lamps fitted to vehicles first used on or after 1 March 2018
- the 1 rear fog lamp which must be fitted to the centre or offside of vehicles first used on or after 1 April 1980

A rear fog lamp isn't needed on:

- vehicles not fitted with front and rear position lamps
- vehicles with permanently disconnected, painted over or masked front and rear position lamps
- tricycles and quadricycles

Front and rear fog lamps are permitted to operate independently of any other lamps or ignition systems.

Fog lamps must produce a steady light which is:

- white – for front fog lamps
- red – for rear fog lamps

Rear fog lamps may be combined with the rear position lamps.

A ‘light source’ means any bulb, LED or other means of emitting light.

You must assess repairs to lamps for security, colour, light output and durability.

Defect		Category
(a)		
(i)	A front or rear fog lamp with a multiple light source up to 1/2 not functioning	Minor
(ii)	An obligatory rear fog lamp missing, or a front or rear fog lamp inoperative or in the case of a multiple light source more than 1/2 not functioning	Major

(b) A lens defective:	
(i) which has no effect on emitted light	Minor
(ii) such that emitted light is adversely affected	Major
(c) A front or rear fog lamp:	
(i) not securely attached	Minor
(ii) likely to become detached	Major

4.5.2 Not in use

4.5.3 Switching

Front and rear fog lamp switches may be combined or independent switches.

The switch or switches must:

- be secure
- be able to be operated from the normal driving position
- operate the fog lamps as intended

Rear fog lamps may be combined with the rear position lamps.

Front and rear fog lamps are permitted to operate independently of any other lamps or ignition systems.

The function of a fog lamp mustn't be adversely affected by the operation of any other lamp.

Defect	Category
(a) Front or rear fog lamp switch:	
(i) not operating in accordance with the requirements	Minor
(ii) inoperative	Major

4.5.4 Compliance with requirements

You must inspect:

- all front fog lamps fitted to vehicles first used on or after 1 March 2018
- the 1 rear fog lamp which must be fitted to the centre or offside of vehicles first used on or after 1 April 1980

Fog lamps must produce a steady light which is:

- white – for front fog lamps
- red – for rear fog lamps

Rear fog lamps may be combined with the rear position lamps.

A rear fog lamp isn't needed on:

- vehicles not fitted with front and rear position lamps

- vehicles with permanently disconnected, painted over or masked front and rear position lamps that are
- tricycles and quadricycles

You must assess repairs to lamps for security, colour, light output and durability.

Defect	Category
(a) Front or rear fog lamp emitted colour, position or intensity not in accordance with the requirements	Major

4.6 Reversing lamps

4.6.1 Condition and operation

You must inspect all reversing lamps fitted to vehicles first used from 1 September 2009.

Reversing lamps must show a white light to the rear. On some vehicles it may be necessary to have the engine running before the reversing lamps will work.

One or two reversing lamps may be fitted, but they must all work.

Buses over 6m long may have 4 reversing lamps which may be:

- all showing white light to the rear
- 2 showing white light to the rear and one on each side

Defect	Category
(a) A reversing lamp inoperative	Minor
(b) A reversing lamp lens defective	Minor
(c) A reversing lamp:	
(i) not securely attached	Minor
(ii) likely to become detached	Major

4.6.2 Compliance with requirements

You must inspect all reversing lamps fitted to vehicles first used from 1 September 2009.

Reversing lamps must show a white light to the rear. On some vehicles it may be necessary to have the engine running before the reversing lamps will work.

One or two reversing lamps may be fitted, but they must all work.

Buses over 6m long may have 4 reversing lamps which may be:

- all showing white light to the rear
- 2 showing white light to the rear and 1 on each side

Defect	Category

(a) Reversing lamp emitted colour, position or intensity not in accordance with the requirements	Major

4.6.3 Switching

You must inspect all reversing lamps fitted to vehicles first used from 1 September 2009.

Reversing lamps must operate automatically when reverse gear is selected and extinguish when reverse gear is deselected.

On some vehicles it may be necessary to have the engine running before the reversing lamps will work.

Defect	Category
(a) Reversing lamp switch not operating in accordance with the requirements.	Major

4.7 Rear registration plate lamps

4.7.1 Presence, condition and operation

You must inspect the registration plate lamps on all vehicles fitted with front and rear position lamps.

Registration plate lamps must light up the rear registration plate. Some vehicles may have these lamps fitted behind the number plate.

A ‘light source’ means any bulb, LED or other means of emitting light.

Tricycles and quadricycles classed as mopeds don't need a rear registration plate lamp.

Defect	Category
(a) A rear registration plate lamp throwing direct white light to the rear	Minor
(b) A rear registration plate lamp or light source missing or inoperative:	
(i) in the case of multiple lamps or light sources	Minor
(ii) in the case of a single lamp or all lamps	Major
(c) A registration plate lamp:	
(i) not securely attached	Minor
(ii) likely to become detached	Major

4.7.2 Compliance with requirements

You must inspect the registration plate lamps on all vehicles fitted with front and rear position lamps.

Registration plate lamps must operate at the same time as the position lamps.

Tricycles and quadricycles classed as mopeds don’t need a rear registration plate lamp.

Defect	Category

(a) Rear registration plate lamp does not illuminate simultaneously with the position lamps	Major

4.8 Rear reflectors

4.8.1 Presence, condition and operation

You must inspect the 2 mandatory rear reflectors that must be fitted.

Rear reflectors aren't needed on vehicles:

- not fitted with front and rear position lamps
- have front and rear position lamps permanently disconnected, painted over or masked

Reflective tape isn’t an acceptable substitute for a rear reflector.

Defect	Category
(a) Reflector defective or damaged:	
(i) by up to 50% of the reflecting surface	Minor
(ii) by more than 50% of the reflecting surface	Major
(b) Reflector:	
(i) not securely attached	Minor
(ii) likely to become detached	Major

4.8.2 Compliance with requirements

You must inspect the 2 mandatory rear reflectors that must be fitted.

Rear reflectors aren't needed on vehicles:

- not fitted with front and rear position lamps
- have front and rear position lamps permanently disconnected, painted over or masked

Reflectors must be symmetrically mounted. Although the precise position of obligatory rear reflectors isn’t part of the inspection, check visually that they are at about the same height and distance from each side of the vehicle.

Tricycles and quadricycles:

- wider than 1,000mm must have 2 rear reflectors mounted symmetrically
- not more than 1,000mm wide only need one centrally mounted rear reflector

Defect	Category
(a) Reflector:	
(i) colour or position not in accordance with the requirements	Minor

(ii) missing or reflecting white to the rear	Major

4.9 'Tell-tales' mandatory for lighting equipment'

4.9.1 Presence, condition and operation

You must inspect the following lighting 'tell-tales':

- headlamp main beam
- direction indicators
- hazard warning lamps
- rear fog lamps

A main beam 'tell-tale' is only required on vehicles first used on or after 1 April 1986. Class 3 vehicles don't need to have the main-beam tell-tale inspected.

A direction indicator 'tell-tale' can be audible or visual.

A hazard warning 'tell-tale' must be a flashing light.

A rear fog 'tell-tale' is only required where a rear fog lamp is mandatory.

Defect	Category
(a) A mandatory tell-tale:	
(i) for direction indicators or hazard warning missing or inoperative	Minor
(ii) for main beam headlamp or rear fog lamp missing or inoperative	Major

4.9.2 Compliance with requirements

You must inspect the 'tell-tale' for hazard warning lamps, which must be a flashing light.

Defect	Category
(a) A hazard warning lamp tell-tale is not a flashing light	Minor

4.10 Trailer electrical socket

You must only inspect the trailer electrical socket on vehicles fitted with a towing coupling.

If there's no tow ball or pin, but the attachment brackets are still in place, you must assess the electrical sockets if the tow ball or pin has been:

- detached
- unbolted
- otherwise removed

You don't need to assess the electrical sockets if the attachment brackets have been deliberately made unfit for further use.
You don't need to assess the trailer electrical socket if you need tools or specialist equipment to remove access panels in the bumper or bodywork to gain access to the socket.

A trailer electrical socket with a defective or missing cover flap that incorporates a lug and spring to hold the plug in place isn't considered to be a defect.
On vehicles fitted with a trailer 13 pin Euro-socket, use an approved device to check that the socket is wired to correctly operate the trailer:

- position lamps
- stop lamps
- direction indicators
- rear fog lamp

Defect	Category
(a) A trailer electrical socket:	
(i) insecure	Minor
(ii) likely to become detached	Major
(b) Trailer electrical socket wiring:	
(i) insulation damaged or deteriorated	Minor
(ii) insulation damaged or deteriorated and likely to cause a short-circuit	Major
(c) A 13-pin trailer socket:	
(i) not functioning correctly	Major
(ii) not functioning at all	Dangerous

4.11 Electrical wiring

You must inspect all visible electrical wiring, other than on Class 3 vehicles.

Defect	Category
(a) Electrical wiring:	
(i) insecure or inadequately secured	Minor
(ii) insecure and in contact with sharp edges or connectors likely to become disconnected	Major
(iii) likely to touch hot or rotating parts, drag on the ground or the connectors for braking or steering disconnected	Dangerous
(b) Electrical wiring:	
(i) slightly deteriorated	Minor
(ii) heavily deteriorated	Major
(iii) for braking or steering components extremely deteriorated	Dangerous
(c) Electrical wiring insulation:	

(i)	damaged or deteriorated	Minor
(ii)	so damaged or deteriorated it is likely to cause a short-circuit	Major
(iii)	in such a condition there is an imminent risk of fire or formation of sparks	Dangerous

4.12 Not in use

4.13 Battery(ies)

You must inspect the battery(ies) on all vehicles including electric and hybrid vehicles. The check does not apply to Class 3 vehicles.

Defect	Category
(a) A battery insecure:	
(i) but not likely to fall from carrier	Minor
(ii) and likely to fall from carrier or cause a short circuit	Major
(b) A battery leaking	Major

5 Axles, wheels, tyres and suspension

Section 5 – Contents

5 Axles, wheels, tyres and suspension

5.1 Axles

5.1.1 Axles

It's recommended that you use wheel play detectors when checking axle security on beam axles.

Defect	Category
(a) An axle fractured.	Dangerous
(b) An axle:	
(i) insecure or with loose fixing bolts	Major
(ii) insecure such that stability is impaired or functionality affected	Dangerous
(c) An axle:	
(i) with an unsafe modification	Major
(ii) modified so that vehicle stability is impaired or axle functionality affected	Dangerous

5.1.2 Stub axles

To check the condition of stub axles:

1. Jack up the front of the vehicle so that the front wheels are off the ground.
2. Observe the relative vertical movement between components.
3. Use a suitable bar under each wheel in turn and lever upwards, looking for play in components.

Then check for play in components using either:

- wheel play detectors in the side to side mode
- rocking each wheel by hand or with a bar in the wheel

Defect	Category
(a) A stub axle fractured	Dangerous
(b) A stub axle swivel pin and/or bush:	
(i) excessively worn	Major
(ii) insecure or directional stability is impaired	Dangerous
(c) Movement between the stub axle and axle beam:	
(i) is excessive	Major
(ii) is so excessive the stub axle is likely to become insecure or directional stability is impaired	Dangerous
(d) A king pin:	
(i) loose in the axle beam	Major
(ii) so loose it is likely to affect directional stability	Dangerous

5 Axles, wheels, tyres and suspension

5.1.3 Wheel bearings

Vehicles with a DGW more than 5,000kg don't need to have rear wheel bearings inspected.

Assess play in wheel bearings by either:

- rocking the wheels in turn while they're jacked clear of the ground
- using wheel play detectors in the side to side mode

Also, rotate each wheel to check for noisy wheel bearings due to excessive roughness.

Defect	Category
(a) A wheel bearing:	
(iii) with excessive play	Major
(iv) play so excessive it is likely to break up or directional control impaired	Dangerous
(b) A wheel bearing:	
(i) excessively rough	Major
(ii) likely to collapse	Dangerous

5.2 Wheels and tyres

5.2.1 Road wheel and hub

Defect	Category
(a) A wheel:	
(i) with a loose or missing wheel nut, bolt or stud	Major
(ii) with more than one loose or missing wheel nut, bolt or stud	Dangerous
(b) A spigot mounted wheel hub:	
(i) excessively worn or damaged	Major
(ii) worn or damaged to the extent that wheel security is adversely affected	Dangerous

5.2.2 Road wheel condition

You only need to inspect the road wheels fitted to the vehicle at the time of the inspection. If you notice a defect on a spare wheel, you should tell the vehicle presenter about it.

You mustn't remove wheel hub caps.

You can accept abutting ends on detachable spring retaining rings on wheel rims of semi-drop centre type (identified by the ends of the ring shaped to interlock) as long as the retainer is adequately and safely located in the wheel rim.

Defect	Category
(a) Any fracture or welding defect on a wheel	Dangerous
(b) A tyre retaining ring:	
(i) not correctly fitted	Major
(ii) likely to come off	Dangerous
(c) A wheel:	
(i) badly distorted or wear between wheel and hub at spigot mounting	Major

(ii) distorted or worn to the extent the wheel or tyre is likely to become detached	Dangerous
(d) A wheel and its fixings not compatible	Major

5.2.3 Tyres

Size

The aspect ratio of a tyre is included in the size marking. For example, a 215/55R15 has an aspect ratio of 55%.

'Standard' car tyres have a nominal aspect ratio of 82% (unless marked otherwise) and these are almost identical in size to tyres with an aspect ratio of 80%. They can be safely mixed in any configuration on a vehicle.

Some tyres may be marked with two sizes. For example, a 185/75R14 tyre may be dual marked 185R14. In such case you can accept either marking.

Load rating – Classes 5 and 7 only

A tyre load rating table is in Appendix B.

Make sure the tyre load rating is suitable for the axle weight.

You can find the permitted maximum laden weight of an axle on the manufacturer's plate.

If axle weights aren't displayed on the manufacturer's plate, you must assume that the load capacity of the tyres are suitable, unless there's indisputable evidence to suggest otherwise.

If a goods vehicle has a 'Ministry' plate showing lower axle weights not to be exceeded in Great Britain, you must those instead of the ones on the manufacturer's plate.

Speed rating – Classes 5 and 7 only

A tyre's speed rating is shown on the sidewall as a letter and usually precedes or follows the load rating. Speed ratings from A to K are unacceptable, with the exception of H.

If no speed rating is shown it must be assumed that the minimum requirements are met.

Load ratings for low speed rated tyres – Class 5 vehicles only

Tyres must be suitable for use up to 70mph (L speed rating) unless the vehicle is a 'restricted speed vehicle'.

If the tyre can carry the maximum permitted axle weight of the vehicle, these vehicles can use tyres with a lower speed rating tyres up to 70mph as follows:

- K speed rating – but the tyre's carrying capacity is reduced by 3%
- J speed rating – but the tyre's carrying capacity is reduced by 7%

For example, K speed rating tyres can be used at 70mph if the load is reduced as follows:

146/143K = 6,000kg single or 10,900kg dual - less 3% = 5,820kg single or 10,580kg dual

You mustn't accept a tyre load rating that's less than the maximum permitted axle weight.

Structure

Tyres of different types of structure, such as radial-ply and cross-ply, mustn't be mixed on the same axle.

Steel and fabric radial-ply tyres are considered to be the same structure.

Run flat and conventional tyres can be mixed on the same axle, although this isn't recommended.

Condition and fitment

Evidence of a tyre contacting a part of the vehicle, such as due to tyre flexing or suspension movement, isn't considered to be a defect. A vehicle should only be rejected if the tyre is fouling a part of the vehicle at the time of test.

Some vehicles have lock stops comprising rubbing pads on the body that the front tyres may contact on a full lock. These are acceptable if they are properly maintained so that they don't damage the tyres. You can use a blunt instrument to open a cut in the tyre to check for exposed ply or cord as long as you don't cause further damage.

When assessing cuts in a tyre, it is permissible to check whether a cut is deep enough to reach the play or cord by using a blunt instrument to open the cut taking care not to cause further damage.

The following criteria should be used when assessing a cut in a tyre:

- any ply or cord that can be seen without touching the tyre – fail
- if by folding back rubber or opening a cut with a blunt instrument, so as not to cause further damage, exposed ply or cord can be seen irrespective of the size of the cut – fail
- if a cut which is more than 25mm or 10% of the section width whichever is the greater, is opened with a blunt instrument and cords can be felt but not seen – fail

Before failing a cut, you must make sure it's the cords that you can feel not a foreign object. If you're not sure, then you should pass and advise.

When assessing lumps or bulges in a radial ply tyre, care should be taken to distinguish between normal undulations in the carcass, resulting from manufacturing, and lumps or bulges caused by structural deterioration.

Take extra care with stretched tyres because they're more prone to sidewall damage.

Recut tyres are only permitted on:

- vehicles over 3,050kg ULW
- goods vehicles with an ULW of at least 2,540kg having at least 16 inch (405mm) diameter wheels
- passenger vehicles with an ULW of at least 2,540kg having 8 or more passenger seats

You should only accept tyres with NHS, Not for Highway Use or similar markings if they have an 'E' marking and a number contained within a circle. Adjacent to this circle, the sidewall must also be marked with a six digit number, which may be preceded by 75R or similar marking (see example below).

E1 75R – 002439

Direction of rotation may be indicated by an arrow and/or words, but an arrow by itself should not be taken to indicate direction of rotation.

Tread depth

A tread pattern is the combination of plain surfaces and grooves extending across the breadth of the tread and round the entire circumference. It excludes any tie-bars, tread wear indicators, or features designed to wear out substantially before the remainder of the pattern, and other minor features.
In simple terms, grooves containing tread wear indicators (TWI) or grooves cut as deep as those containing the wear indicators when new, are considered to be primary grooves. Other grooves or sipes that aren't cut as deep as the primary grooves are secondary grooves and aren't to be considered when assessing tread depth.
The 'breadth of tread' is the part of the tyre which can contact the road under normal conditions of use measured at 90 degrees to the peripheral line of the tread.
Different vehicles require different tread depths.

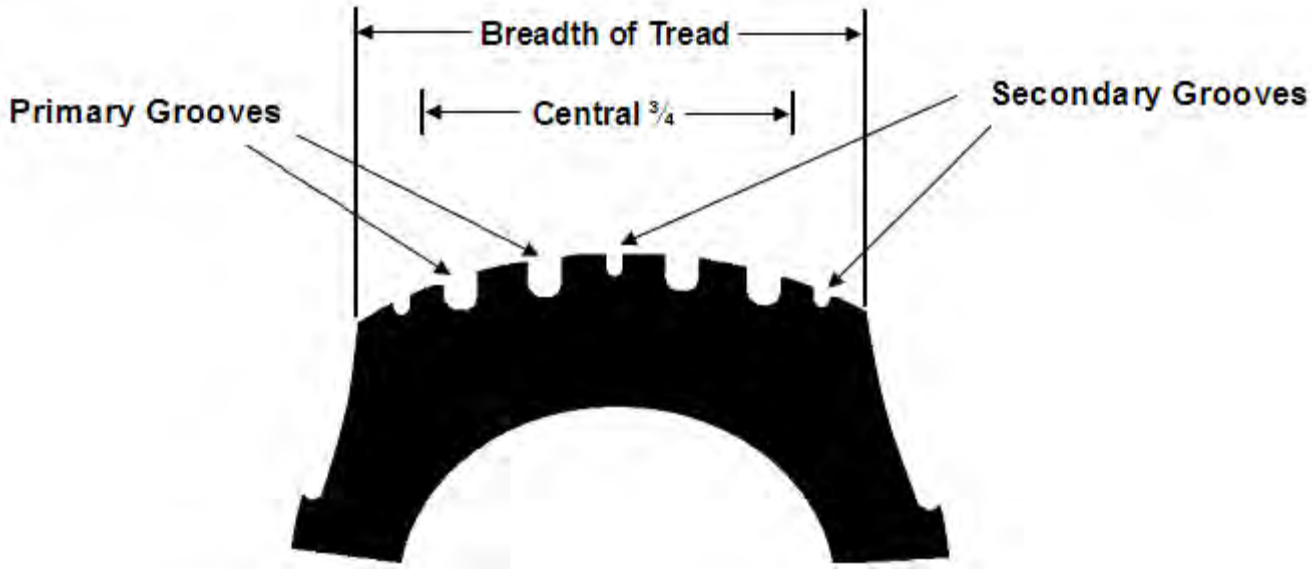
The following vehicles first used on or after 3 January 1933 need 1.6mm tread depth:

- passenger vehicles with a maximum of 8 passenger seats, excluding the driver's seat
- goods vehicles or dual-purpose vehicles not exceeding 3,500kg DGW
- tricycles with an ULW more than 410kg and all quadricycles

The primary grooves of the tread pattern must be at least 1.6mm deep within the central three-quarters of the breadth of tread and around the entire outer circumference of the tyre (see diagram 1).

Either side of the central three-quarters of the tyre can be devoid of tread ('bald').

Diagram 1. Primary and secondary grooves in tyre tread pattern



The following vehicles must have 1.0mm tread depth:

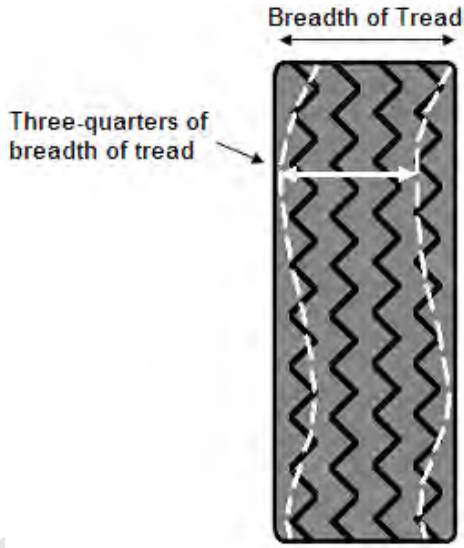
- vehicles first used before 3 January 1933
- passenger vehicles with more than 8 passenger seats excluding the driver's seat

- tricycles with an ULW not exceeding 410kg with an engine capacity greater than 50cc

The tread pattern must be visible over the whole tread area (see diagram 2), and have a depth of at least 1.0mm throughout a single band of at least three-quarters over any section of the breadth of tread round the entire outer circumference of the tyre.

The 1.0mm tread depth requirement applies to the whole tread width if the original tread pattern didn't extend beyond three-quarters of the tyre width when new.

Diagram 2. Tread pattern visibility



Tyre pressure monitoring system (TPMS)

The inspection of the tyre pressure monitoring system (TPMS) is for M1 vehicles first used on or after 1 January 2012.

The TPMS warning lamp (see diagram 3) can operate in many ways depending on the vehicle type. You must only reject vehicles if it's clear that the lamp indicates a system malfunction and not simply indicating that one or more of the tyre pressures is low.

Diagram 3. Example of a TPMS warning lamp

Defect	Category
(a) A tyre: (i) load capacity or speed rating not in accordance with the minimum requirements	Major

(ii) load capacity insufficient for axle presented weight	Dangerous
(b) Tyres on the same axle or on twin wheels are different sizes	Major
(c) Tyres on the same axle of different structure	Major
(d) A tyre:	
(i) seriously damaged	Major
(ii) cords visible or damaged	Dangerous
(e) Tyre tread depth not in accordance with the requirements	Dangerous
(f) A tyre fouling a part of the vehicle	Major
(g) A recut tyre fitted to a vehicle not permitted to be fitted with recut tyres	Major
(h) Tyre pressure monitoring system:	
(i) malfunctioning or tyre obviously under-inflated	Minor
(ii) obviously inoperative	Major
(i) A tyre not fitted in compliance with the manufacturer's sidewall instruction	Major

5.3 Suspension

5.3.1 Springs

This inspection includes bonded suspension units.

You shouldn't reject vehicles with leaf spring type suspension if modified spring anchor or shackle brackets are fitted and there are more mounting holes in the bracket than holes in the chassis.

Defect 5.3.1.b also applies to that part of a leaf spring which is curled to prevent disengagement from a slipper.

You should assess the security of a coil spring to the chassis or axle when jacking and lowering the vehicle. If the spring doesn't correctly locate when the suspension is returned to its normal running position, then you should reject it for being insecurely attached.

You don't need to jack the rear wheels of vehicles with a DGW more than 5,000kg.

An unsafe modification includes welded repairs or the use of excessive heat to highly stressed components (see Appendix A) and modifications which are likely to affect the roadworthiness of the vehicle.

Defect	Category
(a) A spring:	
(i) insecurely attached to chassis or axle	Major
(ii) with fixings loose to the extent that relative movement is visible	Dangerous
(b) A spring:	
(i) or spring component fractured or seriously weakened	Major
(ii) main leaf fractured	Dangerous
(c) A spring:	
(i) missing	Major
(ii) missing and directional control affected	Dangerous

(d) A spring:	
(i) with an unsafe modification	Major
(ii) modified so that the suspension is inoperative	Dangerous

5.3.2 Shock absorbers

You should reject a missing shock absorber only if they were fitted as standard.

Defect	Category
(a) A shock absorber:	
(i) insecurely attached to chassis or axle	Major
(ii) missing or likely to become detached	Dangerous
(b) A shock absorber damaged to the extent that it does not function or showing signs of severe leakage	Major

5.3.3 Suspension arms, rods, struts, sub-frames, anti-roll bars etc.

Some vehicles use thin gauge steel pressings for some highly stressed suspension components. Many of these parts have hollow 'box sections' or up-facing areas that can collect road dirt, salt or other chemicals that can cause severe local corrosion.

You should pay special attention to these components.

You can find guidance on assessing corrosion in Appendix A.

It may be easier to inspect suspension components with the wheels jacked for the checks in Section 5.3.4. You don't need to jack the rear wheels of vehicles with a DGW more than 5,000kg.

Defect	Category
(a) A suspension component:	
(i) insecurely attached to chassis or axle	Major
(ii) missing, likely to become detached or directional stability impaired	Dangerous
(b) A suspension component:	
(i) excessively damaged or corroded	Major
(ii) fractured or likely to fail	Dangerous
(c) A suspension component:	
(i) with an unsafe modification	Major
(ii) modified so that the suspension is operative or likely to fail other components	Dangerous

5.3.4 Suspension joints, pins and bushes

Some rubber/synthetic bushes are designed to provide a comparatively high degree of compliance and are therefore likely to show some movement.

5 Axles, wheels, tyres and suspension

You should only reject rubber or synthetic bushes when you can see serious deterioration of the bonding or flexible material.

Many MacPherson strut top bushes are designed to have significant lateral play when the suspension is hanging free. You should only reject MacPherson strut top bushes when play is due to wear or maladjustment.

You should assess wear or play in spring pins and bushes using either:

- a small pinch bar
- wheel play detectors

Wear is excessive if play is more than:

- 2mm for a 12mm diameter pin
- 3mm for a 25mm diameter pin
- 10% of the pin diameter for pins over 25mm diameter

To fully assess the condition of front suspension components you should use wheel play detectors.

If wheel play detectors aren't available, do the following:

- jack the front wheels clear of the ground, place a suitable bar under each wheel in turn and lever upwards, looking for play in components
- use an assistant to rock and shake the wheels while you examine the relevant items

For vehicles with front suspension systems that don't have the torsion bar or spring force acting on the lower suspension arm follow these steps:

1. Make sure the front wheels are resting on unlocked turning plates.
2. Grasp the top of each wheel and push and pull vigorously in and out to check for play.
3. Grasp each wheel at the 3 o'clock and 9 o'clock positions and push and pull vigorously without pivoting the wheel to check for play.

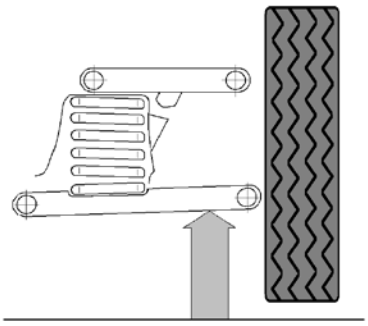
Method of jacking

Vehicles with front suspension types that have the torsion bar or spring force acting on the lower suspension arm must be jacked under the lower suspension arm so that the suspension spring force is removed from the ball joints as shown.

Beam axles should be jacked under the beam.

All other suspension types must be jacked so the suspension hangs freely.

Diagram 4. Jacking up vehicles with front suspension



Defect	Category
(a) A suspension pin, bush or joint:	
(i) excessively worn	Major
(ii) likely to become detached	Dangerous
(b) A suspension joint dust cover:	
(i) severely deteriorated	Minor
(ii) missing or no longer prevents the ingress of dirt etc.	Major

5.3.5 Gas, air and fluid suspension

Defect	Category
(a) A gas, air or fluid suspension system inoperative	Dangerous
(b) A gas, air or fluid suspension system component damaged, modified or deteriorated in a way that:	
(i) it would adversely affect the functioning of the system	Major
(ii) its function is seriously affected	Dangerous
(c) An obvious leak from any part of the system	Major

5.3.6 Complete suspension system

You can find guidance for assessing corrosion in Appendix A.

See Section 6 for guidance on checking the condition of the main load bearing structure not within a prescribed area.

Check the strength and continuity of the vehicle's load bearing members and their supporting structure or panelling around any spring, sub-frame or suspension component mounting.

Defect	Category
(a) The strength or continuity of the load bearing structure within 30cm of any sub-frame, spring or suspension component mounting (a 'prescribed area'):	
(i) is significantly reduced or inadequately repaired	Major
(ii) is so weakened that control of the vehicle is likely to be adversely affected	Dangerous

6 Body, structure and attachments

Section 6 – Contents

6 Body, structure and attachments

6.1 Structure and attachments

6.1.1 General condition

This sub-section covers the condition of the general structure but does not include prescribed areas. These are checked under sections 1 (brakes), 2 (steering), 5 (axles, wheels, tyres and suspension) and 7 (other equipment).

You can find guidance on assessing corrosion in Appendix A of this manual.

Defect	Category
(a) A main load-bearing structural member:	
(i) fractured or deformed such that structural rigidity is significantly reduced.	Major
(ii) fractured or deformed such that steering or braking is likely to be adversely affected	Dangerous
(b) Strengthening plates or fastenings:	
(i) insecure	Major
(ii) so insecure that structural rigidity is seriously reduced	Dangerous
(c) Vehicle structure corroded to the extent that:	
(i) the rigidity of the assembly is significantly reduced	Major
(ii) steering or braking is likely to be adversely affected	Dangerous

6.1.2 Exhaust system

You must check the exhaust system of all vehicles with an internal combustion engine, including hybrid vehicles.

You need to assess the overall security of the exhaust system. One or more missing or defective exhaust mountings doesn't necessarily make the exhaust insecure.

For exhaust noise assessment, see Section 8.1.1.

For assessment of catalytic converters and diesel particulate filters, see Section 8.2.

Defect	Category
(a) Exhaust system leaking or insecure.	Major
(b) Exhaust fumes:	
(i) entering cabin	Major
(ii) causing a danger to health of persons on board	Dangerous

6.1.3 Fuel system

You must check the fuel system on all vehicles with internal combustion engines and hydrogen fuel cells.

You might need to open the luggage compartment to carry out a full inspection of the fuel system.

If a fuel tank has a hole or the filler neck is split and fuel can leak from it, you must fail it for leaking even if the hole or split is above the fuel line.

If you can't get access to the fuel filler cap, see item 4g in the 'Introduction'.

To check for leaks on gas powered vehicles, use a leak detection product conforming to the standard BS EN 14291-2004. You must follow the manufacturer's instructions when using leak detection products.

Defect	Category
(a) Fuel tank, pipe or hose;	
(i) insecure	Major
(ii) insecure such that there is a risk of fire	Dangerous
(b) Fuel system:	
(i) leaking, or missing or ineffective filler cap	Major
(ii) leaking excessively or a risk of fire	Dangerous
(c) Fuel pipe or hose:	
(i) chafing	Minor
(ii) damaged	Major
(d) Not in use	
(e) Fire risk due to fuel tank shield or exhaust shield missing where fitted as original equipment	Dangerous
(f) Any part of an LPG/CNG/LNG or hydrogen system defective	Dangerous

6.1.4 Bumpers

Defect	Category
(a) Bumper:	
(i) insecure or with damage likely to cause injury when grazed or contacted	Major
(ii) likely to become detached	Dangerous

6.1.5 Spare wheel carrier (if fitted)

This inspection is only for externally-mounted spare wheel carriers.

Defect	Category
(a) A spare wheel carrier fractured or insecure	Major
(b) A spare wheel:	
(i) insecure in carrier	Major

(ii) likely to become detached	Dangerous

6.1.6 Coupling mechanisms and towing equipment

You must inspect all types of coupling mechanisms and towbars fitted to the rear of a vehicle, including fifth-wheel couplings.

You don't need to inspect emergency towing eyes.

You must remove tow ball covers to inspect the tow ball.

If coupling mechanisms are behind access panels in the bumper, bodywork or removable panel, you must remove them to inspect the coupling mechanism unless tools are needed to do this.

When checking coupling mechanisms, you may also need to check inside the luggage compartment and lift loose fitting mats or carpet.

You must test retractable towbars in their 'in-use' position. However, if you need tools to do this, you don't need to do it.
If a tow ball or pin isn't fitted at the time of test – because it's detachable, it's been unbolted or otherwise removed – but the attachment brackets are still in place, the brackets should still be assessed unless they have been deliberately rendered unfit for further use.

There might be movement ('play') in some detachable tow balls between the receiver socket and the tapered swan neck fitting, with up to 3mm movement measured at the ball end.

You must reject the following:

- pins, jaws or hooks that've worn by more than 25% of their original thickness
- pin locating holes that've been worn or elongated by more than 25% of their original diameter
- tow balls that are obviously excessively worn

Many 'bolt-on' type tow balls have accessory devices between the tow ball and its mounting flange. You should only reject these if their fitment is clearly likely to adversely affect the roadworthiness of the vehicle and its trailer.

Defect	Category
(a) A towbar component damaged, defective or fractured	Major
(b) A towbar component:	
(i) excessively worn	Major
(ii) so worn it is likely to fail	Dangerous
(c) A towbar attachment:	
(i) defective or insecure	Major
(ii) likely to become detached	Dangerous
(d) A towbar safety device damaged or not operating correctly	Major
(e) A towbar coupling indicator not working	Major
(f) Towbar	
(i) obstructing the registration plate or any lamp	Minor
(ii) obstructing the registration plate so that it is unreadable	Major

(g) Unsafe modification:	
(i) to towbar secondary components	Major
(ii) to towbar primary components	Dangerous
(h) Coupling too weak.	Major
(i) The strength or continuity of the load bearing structure within 30cm of any towbar mounting bracket:	
(i) is significantly reduced	Major
(ii) is so weakened that the towbar is likely to become detached	Dangerous

6.1.7 Transmission

You must inspect all:

- prop shafts
- drive shafts
- prop shaft and drive shaft couplings and bearings
- drive chains or belts

Class 3 vehicles don't need to be inspected for this.

Defect	Category
(a) A transmission shaft:	
(i) securing bolts loose or missing	Major
(ii) likely to become detached	Dangerous
(b) A transmission shaft bearing:	
(i) excessively worn	Major
(ii) likely to break up	Dangerous
(c) A transmission:	
(i) joint, belt or chain excessively worn	Major
(ii) so worn it is likely to fail	Dangerous
(d) A transmission shaft flexible coupling:	
(i) excessively deteriorated	Major
(ii) so deteriorated it is likely to fail	Dangerous
(e) A transmission shaft bent or badly damaged.	Major
(f) A transmission shaft bearing housing:	
(i) fractured or insecure	Major
(ii) likely to fail	Dangerous
(g) A transmission shaft constant velocity joint boot:	
(i) severely deteriorated	Minor

(ii) missing or split	Major

6.1.8 Engine mountings

You must inspect engine mountings for all vehicles except for Class 3 vehicles.

The inspection includes mountings bolted to the gearbox that give essential support for the engine.

Body corrosion close to an engine mounting should only be rejected if it's so severe that it results in excessive movement.

Defect	Category
(a) A engine mounting or bracket:	
(i) severely damaged or deteriorated resulting in excessive movement	Major
(ii) fractured, missing or excessively loose	Dangerous

6.2 Body and interior

6.2.1 Body condition

This inspection is for all vehicles and includes:

- all body panels
- undertrays
- spoilers
- mirror housings

For inspecting bumpers, see Section 6.1.4.

A 'body pillar' applies only to the load carrying area of a goods vehicle.

An unsafe modification is one that is likely to cause injury.

Defect	Category
(a) A body panel or body component:	
(i) damaged or corroded and likely to cause injury when grazed or contacted, or insecure	Major
(ii) likely to become detached	Dangerous
(b) A body pillar:	
(i) insecure	Major
(ii) so insecure that load stability or security likely to be seriously impaired	Dangerous
(c) The passenger compartment in such a condition that:	
(i) it permits the entry of exhaust fumes	Major

(ii) exhaust fumes lead to a danger to health of persons on board	Dangerous
(d) Body:	
(i) has an unsafe modification	Major
(ii) modification likely to adversely affect braking or steering	Dangerous
(e) A bootlid, tailgate, dropside, loading door or access panel cannot be secured in the closed position	Major

6.2.2 Cab and body mounting

You only need to inspect vehicles with a separate body and/or cab. Class 3 vehicles don't need to be inspected for cabs and cab mountings.

You should assess for corrosion within 30cm of the mountings of the body or cab and its chassis.

Cab/body mountings are not prescribed areas and you should only reject the body or cab if its overall security is significantly reduced.

Defect	Category
(a) A body or cab:	
(i) insecure	Major
(ii) insecure to the extent that stability is seriously impaired	Dangerous
(b) A body or cab obviously not squarely located on chassis	Major
(c) Body or cab mounting:	
(i) fixings missing or insecure such that overall security is significantly reduced	Major
(ii) fixings missing or insecure such that stability is seriously impaired	Dangerous
(d) Body, cab or chassis:	
(i) excessively corroded at mounting points	Major
(ii) corroded at mounting points to the extent that overall security or stability is seriously impaired	Dangerous

6.2.3 Doors and door catches

A lack of door handles due to the original design or a specialist modification isn't a defect as long as the door can be latched securely in the closed position.
Driver and passenger doors must open from the outside using the relevant control.

Driver and front passenger doors must also open from the inside using the relevant control.

Load space doors must be able to be secured in the closed position.

You should only reject door hinges, catches and pillars for deterioration if it causes the doors not to work as intended.

Defect	Category
(a) A door will not open using the relevant control or close properly	Major

(b) A door likely to open inadvertently or not remain closed:	
(i) in the case of a sliding door	Major
(ii) in the case of a turning door	Dangerous
(c) A door hinge, catch or pillar:	
(i) excessively deteriorated	Minor
(ii) missing or insecure	Major

6.2.4 Floor

You must inspect the floor in the driver, passenger and goods carrying compartments.

Areas of floor within a 'prescribed area' are covered in sections 1 (brakes), 2 (steering), 5 (axles, wheels, tyres and suspension) and 7 (other equipment).

Defect	Category
(a) A floor:	
(i) excessively deteriorated or insecure	Major
(ii) so deteriorated or insecure it is likely to cause loss of control of the vehicle, injury, load insecurity or instability	Dangerous

6.2.5 Driver's seat

You don't need to check that the driver's seat can be secured in all possible positions. For electrically adjusted seats, you don't need to check that any 'memory position' function is working.

Defect	Category
(a) A driver's seat:	
(i) with a defective structure	Major
(ii) insecure	Dangerous
(b) A driver's seat:	
(i) fore and aft adjustment mechanism not working as intended	Major
(ii) seat moving inadvertently or backrest cannot be retained in the upright position	Dangerous

6.2.6 Passenger seats

You should lift folded seats to inspect seat belts unless this requires the use of tools or specialist equipment.

If you can't lift seats because there are heavy or fragile items on the seat, you can refuse to test the vehicle. For details, see item 4d in the 'Introduction'.

You should only consider a passenger seat structure defective if it's likely to cause injury.

Defect	Category
(a) A passenger seat:	
(i) with a defective structure or the backrest cannot be retained in the upright position	Major
(ii) insecure	Dangerous

6.2.7 Driving controls

You should inspect Class 5 vehicles for driving controls not covered in other sections of the manual, such as:

- clutch
- accelerator
- gear selector
- engine stop

Defect	Category
(a) A driving control necessary for the safe operation of the vehicle:	
(i) not functioning correctly	Major
(ii) not working or functioning such that safe operation of the vehicle is affected	Dangerous

6.2.8 Cab steps (if fitted)

You must only inspect steps that aid entry into the driver's and/or the front passenger compartment.

Defect	Category
(a) A cab step or step ring:	
(i) insecure	Minor
(ii) so insecure that it is likely to cause injury	Major
(b) A cab step or step ring in such a condition that it is likely to cause injury	Major

6.2.9 Not in use

6.2.10 Not in use

6.2.11 Not in use

6.2.12 Handgrips and footrests

You must only inspect tricycles and quadricycles fitted with handgrips and/or footrests for the driver/passenger(s).

You must reject these if they're missing or insecure and it's clear that they're required for the vehicle to be safely operated.

Defect	Category
(a) A handgrip or footrest missing or insecure	Major

7 Other equipment

Section 7 – Contents

7 Other equipment

7.1 Seat belts and supplementary restraint systems (SRS)

7.1.1 Seat belt security

You must inspect:

- all seat belts fitted
- child seats and restraints that are permanently attached to the vehicle using Isofix mountings or nuts and bolts
- anchorages for the securing of disabled persons belts or wheelchairs

A seat belt anchorage ‘prescribed area’ includes the seat mounting points where a seat belt is attached to a seat frame.

For assessing corrosion and using the corrosion assessment tool, see Appendix A.

You don't need to inspect:

- a belt fitted with no corresponding seat
- a buckle or stalk with no corresponding belt

Defect	Category
(a) A seat belt:	
(i) load bearing structure strength or continuity significantly reduced within 30cm of an anchorage point (see Appendix ‘A’)	Major
(ii) anchorage likely to become detached in the event of a collision	Dangerous
(b) Seat belt anchorage loose	Major

7.1.2 Seat belt fitment and condition

You must check any visible parts of:

- all seat belts fitted
- all child seat restraints fitted

You should lift folded seats to inspect seat belts. However, you don't have to do this if you'd need tools to do it.

If you can't lift seats because there are heavy or fragile items on the seat, you can refuse to test the vehicle. For details, see item 4d in the introduction.

You don't need to inspect buckles or stalks with no corresponding belt.

To check the belt buckle follow these steps:

1. Fasten the belt locking mechanism.
2. Try to pull the locked sections apart.
3. Press the release mechanism while pulling on the belt.
4. Make sure the mechanism releases when required.

For retracting seat belts, check that excess webbing is wound into the retracting unit with the mechanism fastened and the seat unoccupied. Check this with the seat base set in its rearmost position.

Some types of retracting belt might need manual help before they retract. If a temporary device is fitted to prevent retraction, you can remove it.

A seat belt installation check might be required on vehicles fitted with more than 8 passenger seats first used before 1 October 2001. If you're not sure, see Section 10 of this inspection manual.

Fitment

Seat belts aren't needed for:

- seats that are only used when the vehicle is stationary, such as a sofa in the living area of a motor caravan
- side facing seats
- occasional seats that fold down when not in use

For further information see the tables in Appendix C to determine which seats need a seat belt.

Defect	Category
(a) A statutory seat belt missing	Major
(b) A seat belt:	
(i) or flexible stalk damaged	Major
(ii) webbing or flexible stalk significantly stretched or weakened	Dangerous
(c) Seat belt not functioning as intended or of an incorrect type	Major
(d) Seat belt buckle missing, damaged or not functioning as intended	Major
(e) Seat belt retractor not functioning as intended	Major

7.1.3 Seat belt load limiters

You must check all seat belt load limiters fitted as original equipment other than on Class 3 vehicles.

Load limiters are designed to minimise seat belt inflicted injury in violent collisions. The simplest type of load limiter is a fold sewn into the belt webbing, which pulls apart when a high amount of force is applied to the belt.

Mechanical load limiters commonly use a torsion bar in the retractor mechanism. These can’t usually be easily inspected.

Defect	Category
(a) A seat belt load limiter fitted as original equipment obviously missing or a folded webbing type load limiter deployed	Major

7.1.4 Seat belt pre-tensioners

You must check all seat belt pre-tensioners fitted as original equipment other than on Class 3 vehicles.

7 Other equipment

Seat belt pre-tensioners activate in certain violent collisions to tighten the seat belt just before the full force of impact. Once activated, a warning device might display.

Defect	Category
(a) A seat belt pre-tensioner fitted as original equipment obviously missing or deployed	Major

7.1.5 Airbags

This inspection is for all airbags fitted as original equipment other than on Class 3 vehicles.

A passenger airbag that is switched off isn't a defect.

Defect	Category
(a) An airbag fitted as original equipment obviously missing	Major
(b) Not in use	N/A
(c) An airbag obviously inoperative	Major

7.1.6 Supplementary restraint system (SRS)

Defect	Category
(a) An SRS malfunction indicator lamp (MIL) indicates a system malfunction	Major

7.2 Not in use

7.3 Anti-theft device

You only need to inspect the anti-theft device on M1 vehicles first used on or after 1 September 2001 with a steering lock as an anti-theft device fitted as original equipment

It's acceptable for a steering lock to be missing or not working as long as the vehicle has an engine immobiliser, or a permanently installed immobilisation device which acts on either the steering, brakes or the transmission.

Some electronic steering locks, generally on vehicles with keyless ignition systems, will only activate when the driver's door is opened or closed.

If it's not practical to check if a steering lock is working, you should give the benefit of the doubt.

Defect	Category
(a) Steering lock missing or not functioning	Minor
(b) Steering lock inadvertently engaging	Dangerous

7 Other equipment

7.4 Not in use

7.5 Not in use

7.6 Not in use

7.7 Audible warning (horn)

An audible warning must be loud enough to be heard by other road users.
For vehicles first used on or after 1 August 1973, the sound emitted must be continuous or uniform. It can't be harsh or grating.
The following can't be used as an audible warning:

- gongs
- bells
- sirens
- anything that has more than one tone

However, on vehicles first used before 1906 the audible warning can be a gong, bell or siren.

Defect	Category
(a) Audible warning:	
(iii) not working properly	Minor
(iv) inoperative	Major
(b) Audible warning control insecure	Minor
(c) Audible warning:	
(i) sound not in accordance with requirements	Minor
(ii) sound likely to be confused with an emergency vehicle siren	Major

7.8 Speedometer

You must check the speedometer of vehicles first used on or after 1 October 1937 with a maximum speed above 25mph. You don't need to check Class 3 vehicles.

If a road test is needed, for example to carry out a decelerometer test, you must check whilst driving that the speedometer is working.

If a road test isn't necessary, you should only reject a speedometer if it’s clearly not working.

Speedometers don't need to be lit on:

- vehicles with no front or rear position lamps
- vehicles that have front or rear positions lamps that are permanently disconnected, painted over or masked

7 Other equipment

You can accept a tachograph as an alternative to a speedometer if it satisfies the requirements of this inspection.

Defect	Category
(a) Speedometer not fitted where one is required	Major
(b) Speedometer:	
(i) operation impaired	Minor
(ii) not working	Major
(c) Speedometer:	
(i) not sufficiently illuminated	Minor
(ii) not illuminated	Major

7.9 Not in use

7.10 Speed limiter (if required)

You only need to check:

- vehicles that must have a speed limiter fitted
- areas of the vehicle that are visible without dismantling

Vehicles that must have a speed limiter are:

- M1 and M2 vehicles with a maximum speed more than 100km/h (62.14mph) if a speed limiter wasn't fitted, with a DGW not exceeding 7,500kg and first used on or after 1 January 2005
- M1 and M2 vehicles with a maximum speed more than 100km/h (62.14mph) if a speed limiter wasn't fitted, with a DGW more than 7,500kg and first used on or after 1 January 1988
- vehicles with more than 16 passenger seats with a maximum speed more than 112.65km/h (70mph) if a speed limiter wasn't fitted, with a DGW more than 7,500kg and first used between 1 April 1974 and 31 December 1987

Vehicles with a DGW not exceeding 7,500kg with Euro III or later engines and first used between 1 October 2001 and 31 December 2004 are required to have a speed limiter. If you know that the vehicle has a speed limiter fitted, then it must meet the requirements of this inspection.

If a vehicle has been modified, such as by changing the rear axle ratio so that it will no longer be able to go faster than 100km/h, the vehicle must have a signed declaration showing the details of the modification.

It shouldn't be possible for the driver to switch off the speed limiter while driving. However, speed limiters wired through ignition switches are acceptable.

Tamperproof devices might be for example mechanical and electrical connections that can be only used with special tools, normally only available from vehicle or component manufacturers for disconnection or adjustment purposes. These are acceptable instead of other types of tamperproof devices such as seals, lock nuts, pins, wires, plastic inserts, sealing compound or sealing paint on mechanical and electrical connections.

7 Other equipment

Modern tamperproof devices are electronic and can't be checked.

You should get the vehicle's DGW from the manufacturer's plate.

For vehicles first used before 1 April 1982 not fitted with a manufacturer's plate, you should instead calculate the laden weight by following these steps:

1. Multiply the maximum number of passengers and crew, excluding the driver, by 63.5kg.
2. Add the kerb or unladen weight displayed on the side of the vehicle.

A speed limiter plate must be securely fixed somewhere easy to see in the driver's compartment. If the plate is fixed to the driver's compartment window it's acceptable for the details to face inwards or outwards. Outward facing plates must be able to be read by a person of average height.

The plate must be clearly and permanently marked with the speed at which the speed limiter has been set. The speed can be shown in mph or km/h.

The character and composition of the plate and size of lettering aren't important provided the details are legible.

Defect	Category
(a) Speed limiter not fitted in accordance with the requirements	Major
(b) Speed limiter obviously not operational	Major
(c) Speed limiter with an incorrect set speed	Major
(d) Speed limiter tamperproof device missing or defective	Major
(e) Speed limiter plate missing or illegible	Major

7.11 Not in use

7.12 Electronic stability control (ESC)

You must check all vehicles fitted with electronic stability control other than Class 3 vehicles.

Electronic stability control is also referred to as ESC, ESP, VDC, and DSC, among many other names. Some systems may be able to be switched off by a switch, whilst others might only be able to be switched off using an electronic menu system.

The dashboard warning lamp for these systems might take various forms and you should only fail a vehicle if you're certain that the warning lamp is indicating an ESC malfunction. You might need to check the owner's handbook.

Defect	Category
(a) Wheel speed sensors missing or damaged	Major
(b) ESC wiring damaged	Major
(c) Other ESC component missing or damaged	Major
(d) ESC switch damaged or not functioning correctly	Major
(e) ESC MIL indicates a system malfunction	Major

8 Nuisance

Section 8 – Contents

8 Nuisance

8.1 Noise

8.1.1 Noise suppression system

You must inspect:

- exhaust silencers
- under-bonnet noise deadening material fitted as original equipment – you don't need to inspect this for Class 3 vehicles

You must use your judgement to assess exhaust noise:

- during the emissions test for the vehicle
- rev the engine to around 2,500rpm or half the maximum engine speed if this is lower on vehicles not subject to an emissions test

Exhaust noise from the vehicle must not be unreasonably above the noise level you'd expect from a similar vehicle with a standard silencer in average condition.

Defect	Category
(a) Exhaust noise levels in excess of those permitted	Major
(b) Any part of the noise suppression system:	
(i) insecure	Major
(ii) likely to become detached	Dangerous

8.2 Exhaust Emissions

8.2.1 Spark ignition engine emissions

8.2.1.1 Exhaust emission control equipment

This inspection is only for vehicles that must have a full catalyst emissions test (disregarding the basic emissions test). You only need to check components that are visible and identifiable, such as catalytic converters, oxygen sensors, and exhaust gas recirculation valves.

Defect	Category
(a) Emission control equipment fitted by the manufacturer: missing, obviously modified or obviously defective.	Major
(b) An induction or exhaust leak that could affect emissions levels.	Major

8.2.1.2 Gaseous emissions

You must inspect vehicles with spark ignition engines first used on or after 1 August 1975.

You don't need to check:

- L category vehicles
- hybrid vehicles – with electric and combustion engines

- hydrogen fuel cell vehicles
- two stroke engines – unless they are subject to a catalyst test

If a vehicle first used before 1 September 2002 is fitted with an engine that's older than the vehicle, you must test it to the standards applicable for the engine. The vehicle presenter must have proof of the age of the engine.

If a vehicle first used on or after 1 September 2002 is fitted with a different engine, you must test it to the emissions standards for the age of the vehicle.

If an engine has been modified in any way, it still has to meet the exhaust emission requirements according to the age of the vehicle.

A personal import must be tested according to its date of first use. However, if you're shown a letter from the vehicle manufacturer proving that the engine doesn't meet British emission standards you must test to the next lower emission standard. For example, a 1995 car first used in Gambia with a letter from the engine manufacturer stating the engine number and showing that the engine can't meet catalyst emission limits, then use the non-cat limits of carbon monoxide (CO) 3.5% and hydrocarbons (HC) 1,200ppm.

For emissions purposes only you should treat the following as first used before 1 August 1975:

- kit cars and amateur built vehicles first used before 1 August 1998
- Wankel rotary engined vehicles first used before 1 August 1987
- Q plated vehicles

To prevent the build-up of fumes, the test should be carried out in a well-ventilated area.

Kit cars

Kit cars and amateur built vehicles first used on or after 1 August 1998 must have either Single Vehicle Approval (SVA) or Individual Vehicle Approval (IVA).

You must test kit cars or amateur built vehicles to the limits in the vehicle's registration document (V5c). If the V5c doesn't show any limits, you must test it to the limits based on the date the vehicle was first used.

Vehicles exempt from emission limits

Some vehicles may never have been able to meet the MOT limits for CO or HC emissions. The vehicle owner must provide proof of this, such as a letter from the vehicle manufacturer. If the vehicle owner can't provide proof of this, you must fail the MOT test if the vehicle isn't within the emissions limits.

Passenger cars

A 'passenger car' is a vehicle that:

- is constructed or adapted to carry passengers
- has up to 5 passenger seats, excluding the driver's seat
- has a DGW not exceeding 2,500kg
- Isn't a goods vehicle, such as a pick-up or a car-derived van

8 Nuisance

If you're not sure if a vehicle is a passenger car, you can confirm it by:

- getting the DGW from the manufacturer's VIN plate
- checking if the vehicle is listed in section 2 of the current emissions data book
- checking the owner's handbook or a data book

If you can't find proof that the vehicle is a passenger car, you must assume it's not a passenger car.

Specialist conversions

For emissions purposes, you must treat specialist conversions as if they had not been converted.

For example, a motor caravan or ambulance converted from a goods vehicle is still to be treated as not being a passenger car, whereas an ambulance converted to a goods vehicle, or a passenger car with seats added is still to be treated as being a passenger car.

Similarly, a vehicle originally built with 6 or more passenger seats, in addition to the driver, which has had seats removed must be still treated as not being a passenger car.

Testing dual exhaust systems

A dual exhaust system has 2 separate pipes from the engine manifold to the tailpipes.

You need to average the emissions from both tailpipes – even if the system has a balance tube between the separate pipes.

To average the emissions, you add both readings together and divide by 2.

For example:

- 1st pipe emits 0.3% CO and 200 ppm HC
- 2nd pipe emits 0.1% CO and 150 ppm HC

Average CO reading is: $\frac{0.3 + 0.1}{2} = 0.2\%$

Average HC reading is: $\frac{200 + 150}{2} = 175$ ppm

If a vehicle has an exhaust holed to the extent that it will fail its MOT, you should recheck the emissions when the exhaust is repaired even if the vehicle doesn't leave the testing station. You should tell the vehicle presenter that any emission readings taken with a leaking exhaust might be incorrect.

Vehicles which run on more than one fuel, such as petrol and LPG, should be tested on the fuel they are running on when presented.

Testing LPG engines

The hydrocarbon (HC) emissions on vehicles running on LPG are propane and not hexane. The HC reading obtained must therefore be divided by the 'propane/hexane equivalency factor' (PEF) marked on the gas analyser.

For example: If the HC reading = 180 ppm and the PEF marked on the machine is 0.48.

The actual MOT value is: $\frac{180}{0.48} = 375$

Emission limits

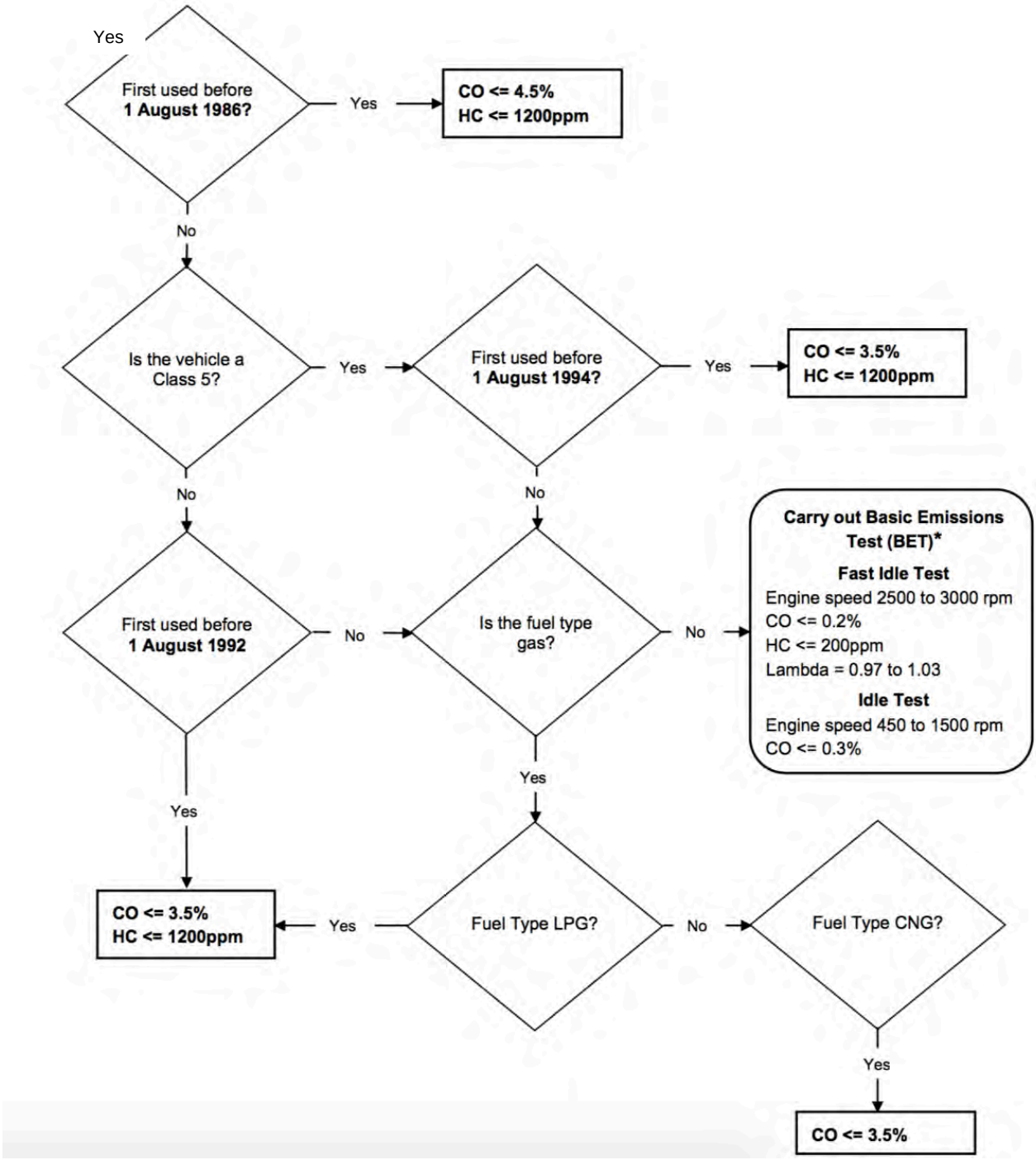
Use the flowcharts 1, 2 and 3 (see below) to decide which emission test is applicable for the vehicle being tested. Follow the flowcharts and notes carefully as early catalyst equipped vehicles may not need a ‘CAT’ test.

Some vehicles give unstable readings due, for example, to their carburettor or fuel injection system design. Before failing a vehicle, make sure that a particular limit has been exceeded constantly for at least 5 seconds.

Some vehicles give unstable readings. Make sure you test the emissions level for at least 5 seconds.

8 Nuisance

Chart 1. Emissions limits for vehicles first used on or after 1 August 1975



*See chart 2 for passenger cars first on or after 1 August 1992

Chart 2. Emissions limits of passenger cars first used on or after 1 August 1992

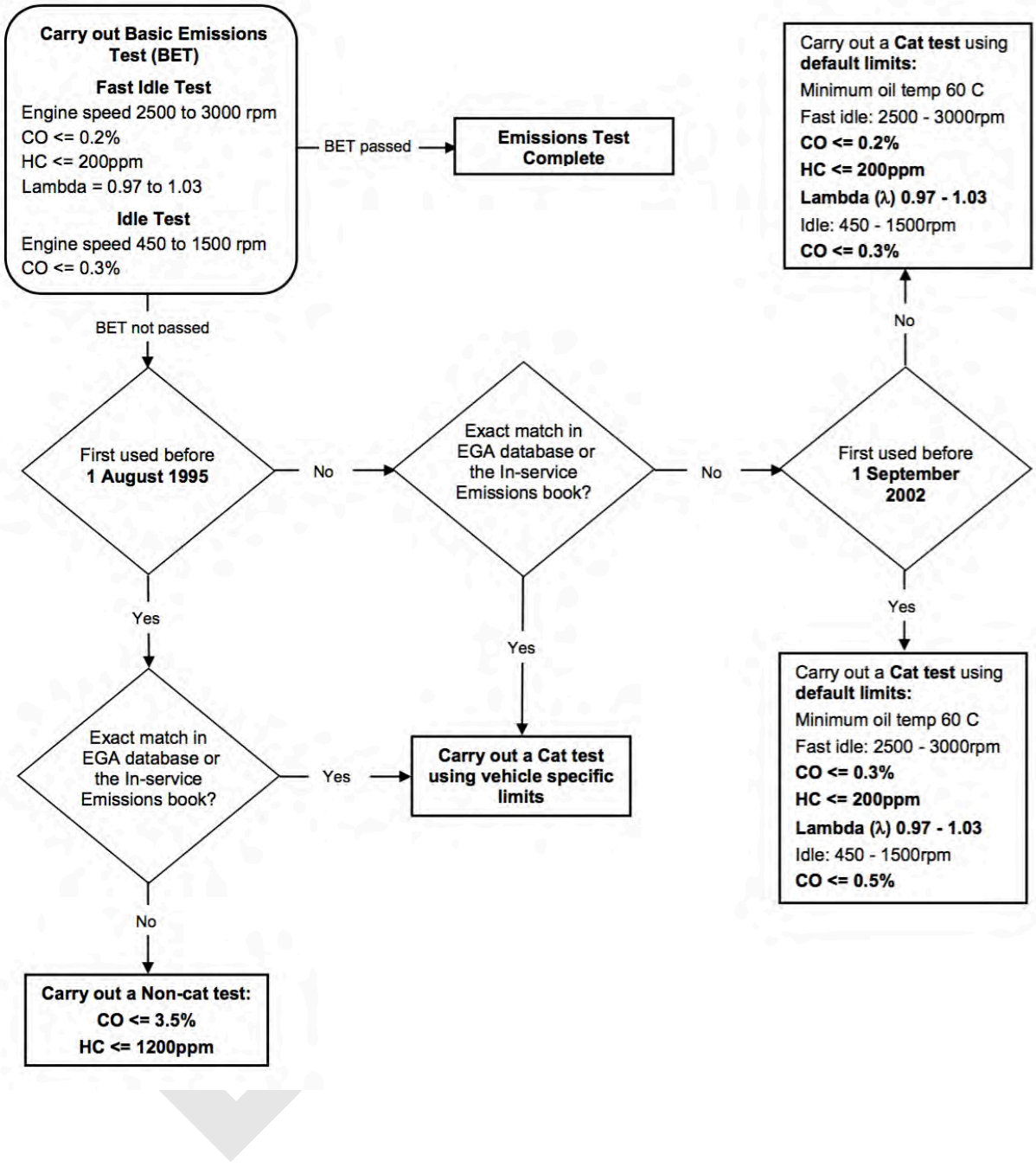
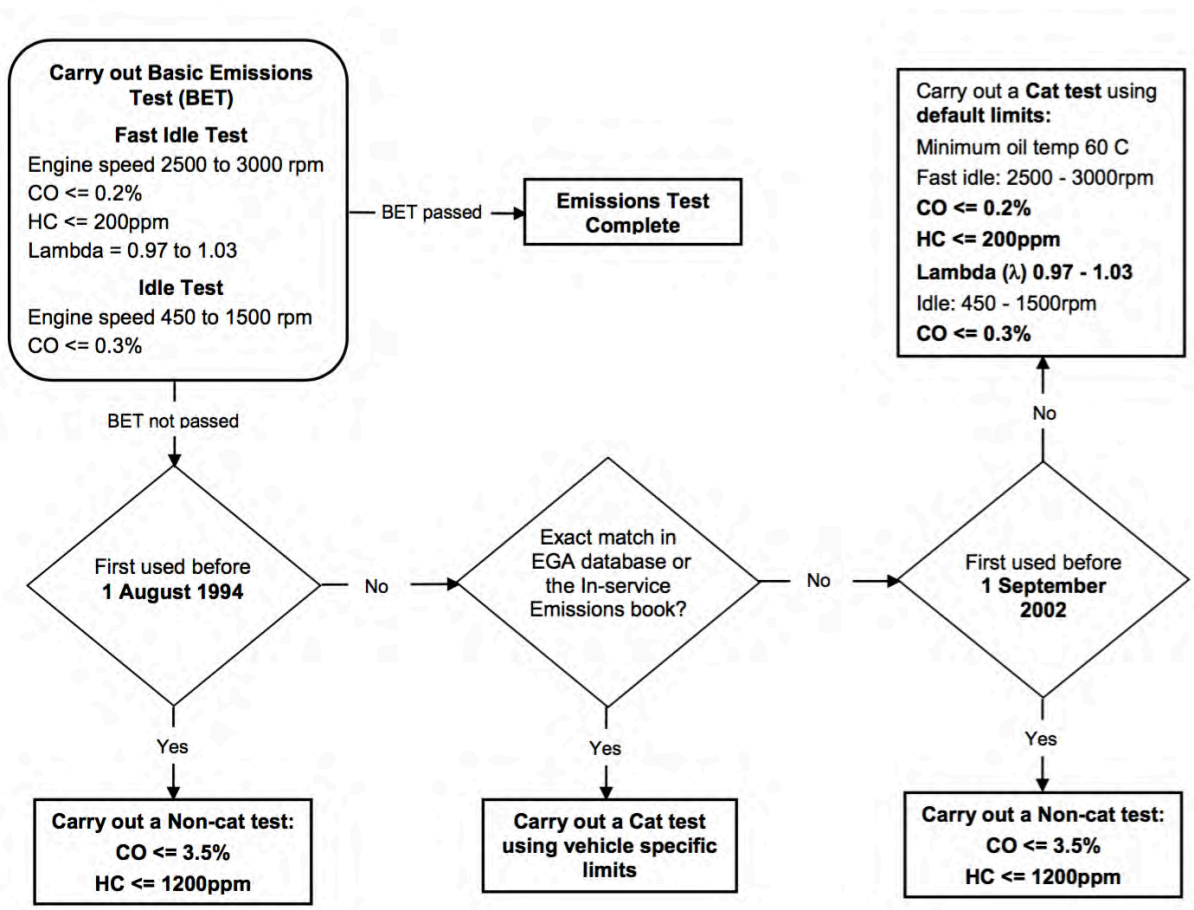


Chart 3. Emissions limits of non-passenger cars first used on or after 1 August 1992



Non-catalyst test

You must:

- measure the exhaust gas for at least 5 seconds at idle
- determine the proportion of carbon monoxide (CO)
- determine the proportion of hydrocarbons (HC) – you don't need to do this for vehicles using compressed natural gas (CNG)

During the test, make sure:

- the engine is idling normally – if this isn't possible, you can use light throttle pedal pressure
- the engine is warm
- any enrichment device, like a choke, isn't operating
- there isn't significant electrical loading, such as heated seats or heated rear windows

You must deduct any residual hydrocarbons from the HC reading. Residual hydrocarbons are those that are picked up by the analyser when it samples clean air.

If a vehicle meets the CO requirement at its normal idling speed but fails the HC check, apply light pressure to the throttle and re-check the HC level at a high idle speed of about 2,000rpm. If the HC reading is then 1,200ppm or less, the vehicle will meet both the CO and HC requirements.

Basic emissions test

Ensure a daily leak test has been carried out.

Make sure the engine is hot. If the engine isn't hot, raise the engine speed to between 2,000rpm and 3,000rpm until it's up to normal operating temperature.

You can tell that the engine is hot from any of the following:

- the temperature gauge
- the cooling fan has cut in
- the cooling hoses are hot

To do the emissions test:

1. Make sure the engine is idling normally – to check this use the vehicle tachometer or attach an engine speed measuring device.
2. Do a HC hang-up check to make sure that HC is less than 20ppm.
3. Insert the analyser probe into the exhaust.
4. Raise the engine speed to between 2,500rpm and 3,000rpm and hold it steady.
5. Record the CO, HC and lambda readings.
6. Allow the engine speed to return to idle (between 450rpm and 1,500rpm).
7. Record the CO reading.

To pass the basic emissions test, the readings must be within all the following limits:

- CO up to 0.2% at fast idle (2,500rpm to 3,000rpm)
- HC up to 200ppm at fast idle (2,500rpm to 3,000rpm)
- Lambda between 0.97 and 1.03 at fast idle (2,500rpm to 3,000rpm)
- CO up to 0.3% at idle (450rpm to 1,500rpm)

If the vehicle passes the test, the analyser will print out 2 copies of the results. Give a copy to the vehicle presenter. The VTS must keep the second copy for 3 months.

If the vehicle doesn't pass the basic emissions test, you need to:

1. Enter the vehicle's details into the analyser.
2. Use the testing flow charts to check which test to do next.
3. Carry out either a full catalyst test or a non-catalyst test as appropriate.

Full catalyst test

Use the flowcharts 1, 2 and 3 within this section to establish which emissions test and limits you must use for the vehicle under test.

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Use the vehicle exhaust emission standards on https://www.gov.uk/government/publications/in-service-exhaust-emission-standards-for-road-vehicles or use the EGA database to find any specific limits for the vehicle.

You might need the following details to find the vehicle's exact limits:

- vehicle make
- vehicle model
- model code
- engine code
- engine size
- VIN

If you can find an exact match other than the model or engine code, use the lesser of the vehicle's specific limits or default limits.

If you can't find an exact match, test it to default limits.

To carry out the full catalyst test:

1. Connect the engine speed and oil temperature measuring devices. If you can measure the engine speed only after removing a cosmetic engine cover, you must remove the cover if it's easily un-clipped and then carry out the speed measurement. If the engine speed can't be measured, you should use the vehicle tachometer if fitted. Otherwise you can by-pass the engine speed measurement and make an estimate.
2. Check the engine oil temperature. If it's below the minimum vehicle specific requirement, raise the engine speed to between 2,000rpm and 3,000rpm and maintain this speed until the minimum engine oil temperature has been reached. Remove temperature measuring probe and replace dipstick.
3. Engine oil temperature must be measured whenever possible, using the approved device. If in exceptional circumstances the engine oil temperature can't be measured, check that either:
    - the temperature gauge indicated that the engine was at its normal operating temperature
    - the cooling fan had cut in
    - the coolant pipes were hot
4. Perform a HC hang-up check and ensure that HC is less than 20ppm before continuing. Insert the analyser sample probe.
5. If the engine speed is clearly above the vehicle specific limit and it can be easily adjusted, you can adjust it and complete the test – the adjustment is not, however, part of the MOT test.
6. Follow the EGA prompts until the full catalyst test is completed, at which point the analyser will produce 2 printouts.
7. Give one of the printouts to the vehicle presenter. VTS must keep a copy for 3 months.

Engine malfunction indicator lamp

Turn on the ignition and check that the engine malfunction indicator lamp (MIL) illuminates and then goes off. On some vehicles it will be necessary to start the engine before the MIL goes off.

Defect	Category
(a) Emissions levels exceed the manufacturer's specified limits	Major
(b) Emissions levels exceed default limits	Major
(c) Lambda coefficient outside the default limits or the range specified by the manufacturer	Major
(d) Emissions test unable to be completed	Major
(e) Engine is idling clearly above its normal idle speed	Major
(f) Exhaust emits dense blue or clearly visible black smoke for a continuous period of 5 seconds at idle	Major
(g) Exhaust emits excessive dense blue or clearly visible black smoke during acceleration which would obscure the view of other road users	Major
(h) Engine MIL inoperative or indicating a malfunction	Major

8.2.2 Compression ignition engine emissions

8.2.2.1 Exhaust emission control equipment

You only need to check components that are visible and identifiable, such as diesel oxidation catalysts, diesel particulate filters, exhaust gas recirculation valves and selective catalytic reduction valves.

If a diesel particulate filter has clearly been cut open and rewelded, you should reject it unless the vehicle presenter can show evidence that there was a valid reason to cut it open, such as for filter cleaning.

Defect	Category
(a) Emission control equipment fitted by the manufacturer missing, obviously modified or obviously defective	Major
(b) An induction or exhaust leak that could affect emissions levels	Major
(c) Evidence that the diesel particulate filter has been tampered with	Major

8.2.2.2 Opacity

This inspection isn't for 'L' category vehicles or electric/combustion engine (hybrid) vehicles.
An approved diesel smoke meter (DSM) will be needed to perform this inspection on vehicles first used on or after 1 January 1980.

The probe on some types of smoke meter must be correctly aligned with the exhaust gas flow. You may have to check the smoke meter manufacturer's instructions.

Don't do a smoke test if the engine isn't in a safe condition. You must make sure it's safe by asking the vehicle presenter and carrying out a brief examination of the engine.

The smoke test shouldn't be carried out if:

- there is insufficient oil in the engine
- the engine oil pressure is too low
- there is abnormal engine noise

- the governor has been tampered with
- the camshaft belt is in an unsatisfactory condition

If you judge it to be unsafe to conduct the smoke test, you must show the reason for refusing to carry out the test on the VT30 (see Introduction 4h).

On vehicles first used before 1980 the engine should be at its normal operating temperature. You can check this from the temperature gauge, cooling fan switching on and off or by feeling hot coolant hoses. Vehicles first used after 1980 vehicles must have an instrumented smoke test and it's important to ensure the engine is at least 80°C or normal operating temperature if lower, before carrying out the test. You should check the engine temperature with an engine oil temperature probe or other approved device.
If due to the vehicle design, or where oil temperature measurement is impractical, the engine's normal operating temperature may be checked by other means, such as the operation of the engine cooling fan. It isn't normally sufficient to run the engine with the vehicle stationary to warm it up to temperature. When testing vehicles with automatic transmission you must take care to avoid overheating the transmission system. Don't carry out unnecessary engine acceleration or prolonged high revving of the engine. You may have to check the vehicle manufacturer's instructions.

If a vehicle has a dual exhaust system, you must repeat the smoke test and average the emissions from the tailpipes. To average the emissions, you add both readings together and divide by 2.

For example:

- first pipe emits smoke level of $1.50m^{-1}$
- second pipe emits smoke level of $1.00m^{-1}$

Average smoke level is: $\frac{1.5 + 1.0}{2} = 1.25m^{-1}$

A dual exhaust system has 2 separate pipes from the engine manifold to the tailpipes. Even if there is a balance tube between the separate pipes it's still considered a dual exhaust.

Maximum engine revs can't be achieved on some vehicles due to design features. If this is the case, the vehicle must be tested as presented. Such vehicles, as well as some with low emission diesel engines (mainly Euro IV and onwards) may fail to trigger a reading on the DSM.

If you can't get a reading or the DSM shows an error, you should mark the printout to show that the emissions limits were tested and met but the DSM couldn't register the reading.

If you can't print out the results from the meter, write down the following details and keep them for 3 months:

- test station number
- tester's name
- date and time
- test number
- vehicle type
- vehicle registration number
- that the vehicle passed the emissions test
- no print out was produced due to low emissions

8 Nuisance

Test procedure – vehicles manufactured before 1980

Vehicles manufactured before 1980 only need to be visually inspected for emitted smoke at both idle and during free acceleration.
How to test:

1. Make sure the engine is at its normal operating temperature – use the temperature gauge, cooling fan cut in or hot coolant hoses to check this.
2. Make sure any oil temperature probe has been removed.
3. Increase the engine speed to around 2,500rpm or half the maximum engine speed – use whichever speed is lower.
4. Keep the engine at this speed for 30 seconds – this should fully purge the inlet and exhaust system.
5. Allow the engine to return to idle.
6. Assess the smoke emitted from the tailpipe.
7. Quickly increase the engine speed to around 2,500rpm or half the maximum engine speed – use whichever speed is lower and assess the smoke emitted from the tailpipe.

Test procedure – vehicles manufactured in or after 1980

Vehicles manufactured in or after 1980 must be tested for exhaust smoke using an approved diesel smoke meter. Make sure you follow the smoke meter manufacturer's instructions.

When testing automatic transmission, you might want to check the vehicle manufacturer's instructions so that you don't overheat the transmission system. Avoid unnecessary engine acceleration or prolonged high revving of the engine.

Before the test, check the maximum smoke level limit for the vehicle and enter the required details into the diesel smoke meter.

For vehicles first used before 1 July 2008, the limit will be one of the following:

- the level specified on the manufacturer's plate
- $2.5m^{-1}$ for a non-turbocharged engine – if it's not stated on the manufacturer's plate
- $3.0m^{-1}$ for a turbocharged engine – if it's not stated on the manufacturer's plate

For vehicles first used between 1 July 2008 and 31 December 2013, the limit will be one of the following:

- the level specified on the manufacturer's plate
- $1.5m^{-1}$ – if it's not stated on the manufacturer's plate

For vehicles first used on or after 1 January 2014, the limit will be one of the following:

- the level specified on the manufacturer's plate
- $0.7m^{-1}$ – if it's not stated on the manufacturer's plate

If the smoke level is displayed on the VIN plate, it will be a number, usually in a box (as below), and often positioned in the bottom right corner of the VIN plate.

8 Nuisance

How to test:

1. Make sure the engine checks are satisfactory.
2. Make sure the engine temperature is above 80 degrees centigrade or at its normal operating temperature whichever is lower.
3. Make sure you've removed any oil temperature probes.
4. Increase the engine speed to around 2,500rpm or half the maximum engine speed – use whichever speed is lower.
5. Keep the engine at this speed for 30 seconds – this should fully purge the inlet and exhaust system.
6. Increase the engine speed slowly to maximum engine revolutions (revs) to check that the governor is working properly
7. Once the engine speed has stabilized or it becomes clear that the governor isn't working, release the pedal and allow the engine to return to idle.
8. Stop the engine and prompt the meter to do a zero check.
9. Insert the meter fully and securely in line with the gas flow.
10. Restart the engine.
11. Following the meter prompts, press down the accelerator pedal quickly and continuously so that the engine reaches full fuel position in less than one second.
12. Hold the engine at full fuel position until a release prompt is given and immediately release the accelerator pedal.
13. Allow the engine and any turbochargers to return to idle.
14. After the first acceleration read the smoke level displayed on the meter.
15. If the smoke level is above the limit for the vehicle, carry out 2 further accelerations.
16. If the mean smoke level is still above the limit for the vehicle, carry out further accelerations up to a maximum of 6 in total and read the smoke level display on the meter after each acceleration.

The vehicle has passed the opacity test if any of the following happens:

- the first acceleration showed that the smoke level was at or less than the limit for the vehicle
- the mean smoke level from the first 3 readings was at or less than the limit for the vehicle
- the mean smoke level from any consecutive 3 readings was at or less than the limit for the vehicle

If the smoke levels from the first acceleration were significantly higher than the limit, you can choose to abort the test.

On vehicles fitted with a diesel particulate filter, also check that no visible smoke is emitted from the exhaust during the metered check.

Engine malfunction indicator lamp

Turn on the ignition and check that the engine malfunction indicator lamp (MIL) illuminates and then goes off. On some vehicles it will be necessary to start the engine before the MIL goes off.

Defect	Category
(a) Smoke opacity levels exceed the manufacturer's specified limit.	Major
(b) Smoke opacity levels exceed default limit	Major

(c) Exhaust emits excessive smoke or vapour of any colour to an extent likely to obscure the vision of other road users	Dangerous
(d) Exhaust on a vehicle fitted with a diesel particulate filter emits visible smoke of any colour	Major
(e) Emissions test unable to be completed	Major
(f) Emissions test aborted because smoke levels are significantly in excess of the specified limit values	Major
(g) Engine MIL inoperative or indicating a malfunction	Major

8.3 Not in use

8.4 Other environmental items

8.4.1 Fluid leaks

You must check for fluid leaks on all vehicles other than Class 3. You should do this with the engine idling.

A leak of fluids such as engine coolant, screen wash and fluid required for Selective Catalyst Reduction aren't reasons for failure.
You should fail a vehicle if a fluid leak creates a pool on the floor within 5 minutes that's more than 75mm in diameter or if there are many leaks which collectively leak fluid at the same rate.

You can refuse to carry out the test if there's an excessive fluid leak. For details see item 4 in the 'Introduction' of this inspection manual.

Defect	Category
(a) Fluid:	
(i) leaking excessively and likely to harm the environment or to pose a safety risk to other road users	Major
(ii) leaking continuously and likely to pose a serious risk to road safety	Dangerous

9 Supplementary tests for buses and coaches

Section 9 – Contents

9 Supplementary tests for buses and coaches

9.1 Doors

9.1.1 Entrance and exit doors

You should only reject a door for deteriorated condition if:

- its function is impaired
- it’s likely to cause injury

Emergency controls are only needed on power operated doors. However, power operated doors constructed or adapted for the secure transport of prisoners don't need emergency controls.

If you're not sure if there's a 'door open' warning device, you should give the benefit of the doubt.

Defect	Category
(a) An entrance or exit door defective in operation	Major
(b) An entrance or exit door:	
(i) excessively deteriorated	Minor
(ii) deteriorated and likely to cause injury	Major
(c) An entrance or exit door emergency control inoperative	Major
(d) An entrance or exit door remote control or warning device inoperative	Major

9.1.2 Emergency exits

You must inspect the emergency exits for all buses and coaches first used on or after 1 April 1988 except those constructed or adapted for the secure transport of prisoners.

Buses and coaches first used on or after 1 April 1988 must have at least one passenger door on the nearside and one of the following:

- an additional passenger door at the rear – in this case, the bus or coach doesn't need a designated emergency exit
- an emergency exit at the rear
- an emergency exit on the offside (not the driver’s door)

Emergency exits must latch securely closed and be able to be opened from both inside and outside the vehicle (with the door unlocked).

All designated emergency exits must be clearly marked with words such as 'EMERGENCY DOOR' or 'EMERGENCY USE ONLY'. Letters must be upper case and must be at least 25mm high.

If a ‘break glass’ emergency exit is fitted, there must also be a suitable hammer or similar device close to it.

9 Supplementary tests for buses and coaches

Defect	Category
(a) An emergency exit defective in operation	Major
(b) An emergency exit sign:	
(i) illegible or not in accordance with the requirements	Minor
(ii) missing	Major
(c) Missing break glass hammer (where required)	Minor
(d) No emergency exit provided (where one is required) or access blocked	Major

9.2 Not in use

9.3 Not in use

9.4 Not in use

9.5 Not in use

9.6 Passenger grab handles

You should reject rails and grab handles, including those that form part of the seat back, if they're either:

- insecure
- in a condition likely to cause injury

Defect	Category
(a) Not in use	
(b) A passenger grab handle:	
(i) Defective	Minor
(ii) insecure or unusable	Major

9.7 Steps and stairs

You must check all passenger stairs on double deck or split level buses and coaches.

You must reject stairs if they're likely to either:

- be a trip hazard
- cause injury

9 Supplementary tests for buses and coaches

Defect	Category
(a) A step or stair:	
(i) in a deteriorated condition	Minor
(ii) significantly damaged	Major
(iii) in such a condition as to affect the stability of passengers during use	Dangerous
(b) A retractable step not operating correctly	Major

10 Seat belt installation check

Section 10 – Contents

10 Seat belt installation check

10.1 Seat belt installation guidance notes

All belts should be checked for:

- installation
- operation
- wear

However, the following types of belts should be checked for operation and wear only:

- seat belts for rear or side facing seats
- disabled person's belts which are permanently attached to the vehicle
- child restraints which are permanently attached to the vehicle
- mandatory seat belts as specified in Section 5.1 of this manual

If the disabled person's belts or child restraints aren't permanently attached to the vehicle, they don't need to be tested.

Before inspecting the seat belt installation, ask the vehicle presenter to remove seat cushions and to open any access flap or luggage locker door that have been designed to be opened, so that the seat belt installation can be seen.

If some of the parts of seat belt installation are difficult to see, it may help to put the vehicle on a pit or hoist.

The vehicle presenter should show documentary evidence, if available, showing that a seat belt complies with type approval standards but hasn't been fully type approved, or that is traceable to an installation that has been tested and shown to meet the requirements of ECE Regulation 14 or Community Directive 76/115.

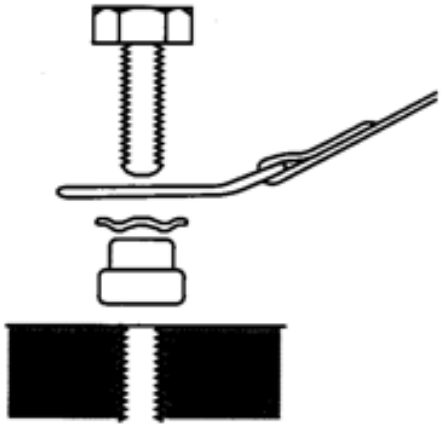
The document should show:

- registration number or chassis number of the vehicle
- name of the installer
- address of the installer
- reference number of the installation test
- date of the installation test
- location of the installation test

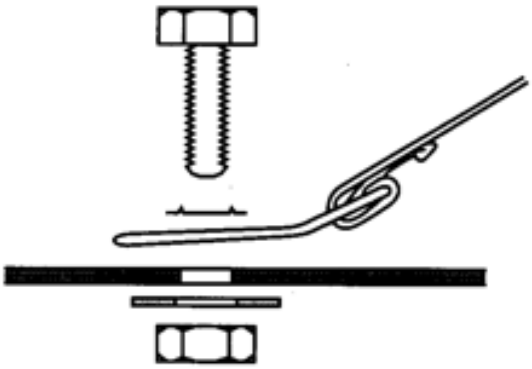
Only the original certificates are accepted, meaning photocopies of the certificates won't be accepted. Presentation of the certificate doesn't replace the need for the examination, but it may support the quality of the installation. It may also help resolve differences over the acceptability of the installation, for example in cases where reinforcement plates have been used.

Diagram 1. Typical methods of attaching seat belts

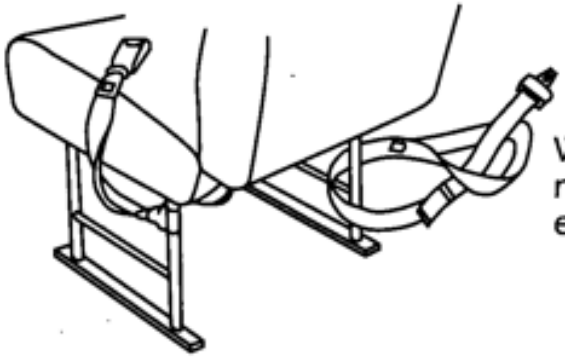
10 Seat belt installation check



Direct attachment to floor

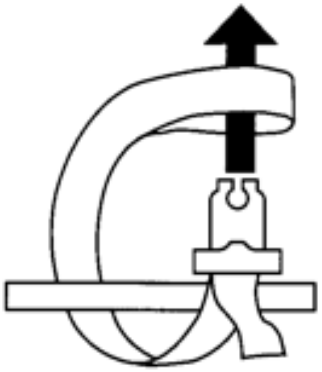


Direct attachment to seat frame



When installed, free movement must not exceed 25mm

Installation of looped seat



Method of attaching looped seat belt

A. Check that the buckle operates correctly on all belts and the seat belt adjusts satisfactorily. Subsequent cutting or reworking of the webbing will be a reason for failure.

   You can pass the installation if the free end of looped belts or static belts have the webbing folded and stitched to prevent the buckle from being dismantled. You must fail it if there are any knots in the belt webbing.

B. Seat squabs should be removed, so that the condition of the belt and mountings can be inspected. The seat squabs should be put back by the end of the test.

C. Check for any sharp edges that the belt could rub on or pull across during use.

D. Seat belts (other than looped belts) that are anchored to the seat frame or the vehicle floor must be secured with appropriate mounting bolts:

Table 1. Minimum acceptable size and bolt grade for seat belt anchorage

Type of anchorage	Minibus	Coach or large bus
single anchorage	M10 standard material	M8 high tensile steel M10 standard material
double anchorage	7/16" standard material	7/16" standard material

10 Seat belt installation check

	M10 high tensile steel	M10 high tensile steel

E. The bolt grade can be identified by markings on the bolt head:
   - standard material = P, 4.6 or SAE equivalent
   - high tensile steel = S, 8.8 or SAE equivalent
   - no markings = standard material

   If the bolt grade isn't clear, you must assume it to be of standard grade.

   It's extremely important that a correct size bolt is used in the seat belt anchorage, for example an 8mm bolt shouldn't be used in an 11.5mm diameter hole. The only exception to this is if a 'stepped washer' or a collar is used to eliminate an excessive clearance, and a suitable washer is fitted between the bolt head and the anchorage to prevent the bolt pulling through.

   You must fail the installation if smaller bolts, self-tapping screws or wood screws have been used.

F. It isn't acceptable to drill tubular seat frames to allow belts to be bolted to the frame. However, if the manufacturer has approved the installation the vehicle presenter must show original documentary evidence by the manufacturer or their agent declaring that the installation is satisfactory.

G. Installation with clamp type brackets can be passed as long as the brackets are properly secured.

H. Seats with a wooden frame that have the belts mounted directly to the frame, or to a metal base that is attached to the frame by wood screws only, must be rejected. The installation can't be passed unless there are additional reinforcements that provide a direct load path to the seat and leg and side mounting.

   These reinforcements could be steel angle sections or plates, but alternative materials may be used as long as they are of comparable strength (see Diagrams 3 and 4 for details of a typical installation).

Diagram 3. Duple dominant seat arrangement – rear view

10 Seat belt installation check

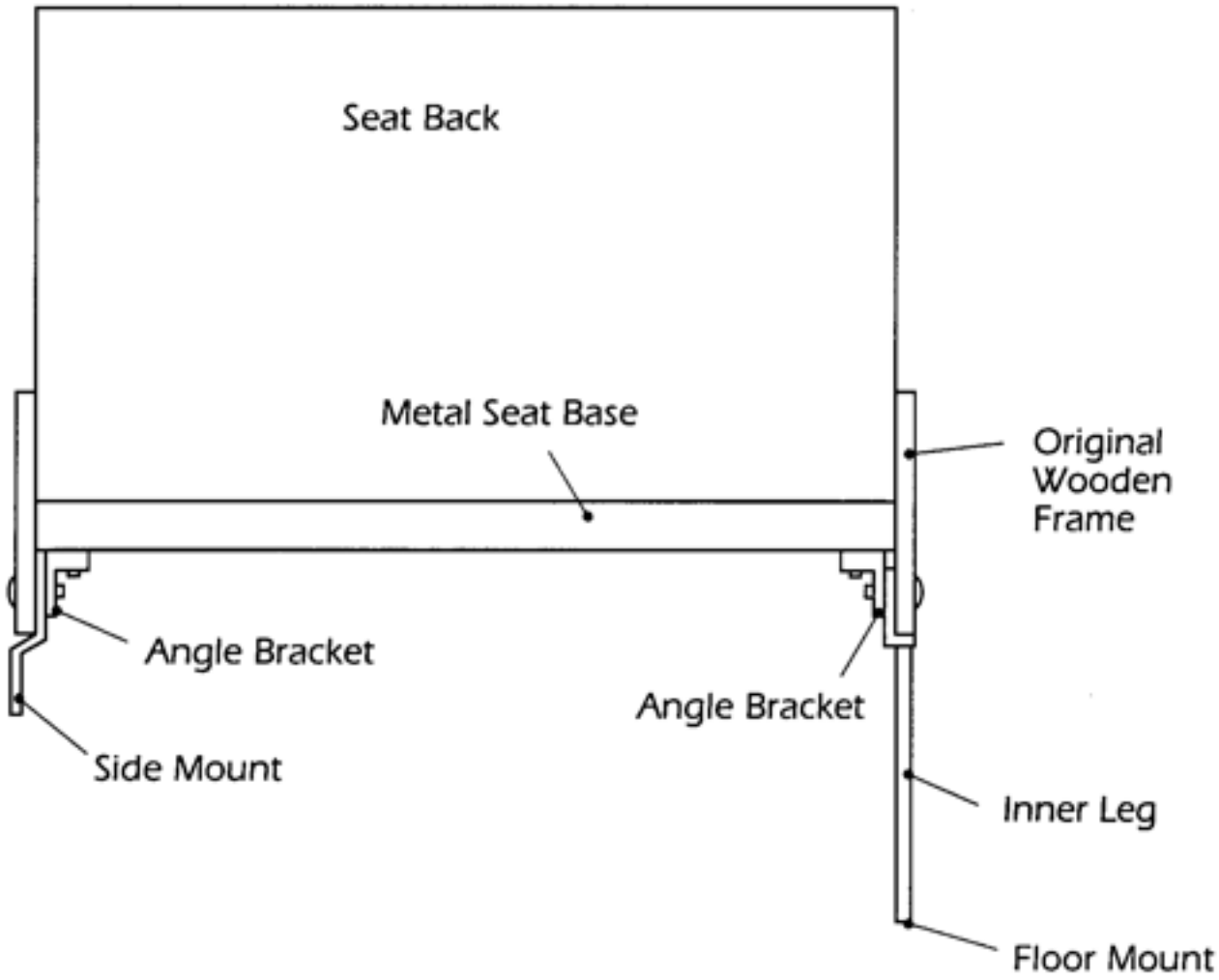
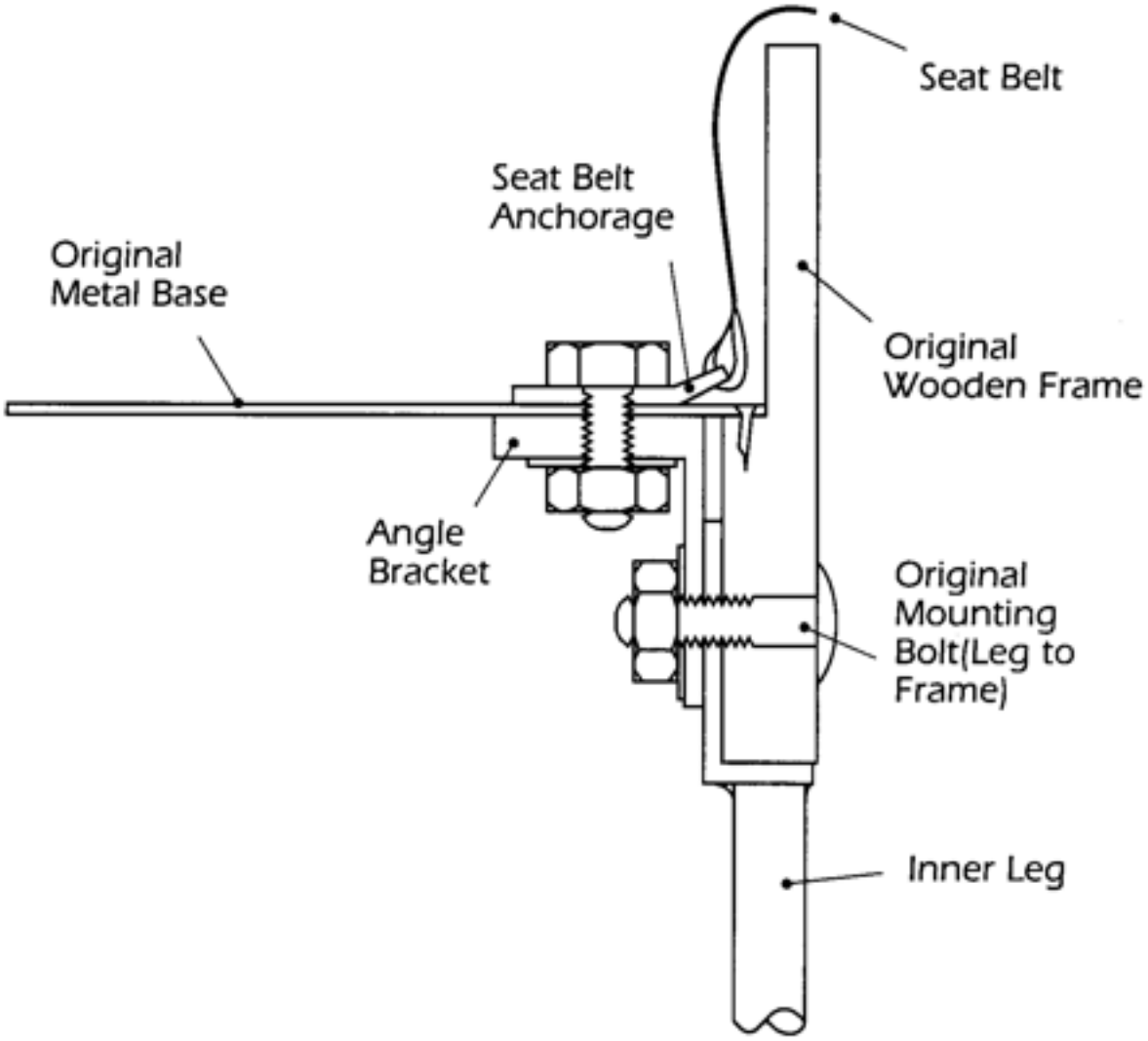


Diagram 4. Duple dominant seat arrangement – sectional view of the reinforcement enlargement

10 Seat belt installation check



I. Seat belts that are attached to thin sheet metal frames, must have bolts of the minimum dimensions (see Table 1 above) anchoring the belt and be supported by load spreading washers between the frame and the nut.

Typically, this would be 25mm in diameter and 2mm thick. If 2 belts are attached at the same point with a single bolt, then a larger reinforcement plate 35mm diameter × 3mm thick (or a rectangular plate of minimum dimensions 21×46×3mm) must be used. The sizes quoted are for steel reinforcement plates, alternative materials may be used but must provide comparable strength.

J. Seat belts fitted to the seats shouldn't be anchored solely to the thin metal sheet separating the boot area from the passenger compartment. Seat belt anchorages should be secured to a strong cross member connected to the structural members of the vehicle.

The connection should be able to transfer the seat belt loads into the structure of the vehicle. It may be necessary to construct an additional framework at the rear of the vehicle.

An example of a typical reinforcement would be the use of additional square section tubing 40×40×3mm, or angle plate 50×50×4mm across the full width of the vehicle.

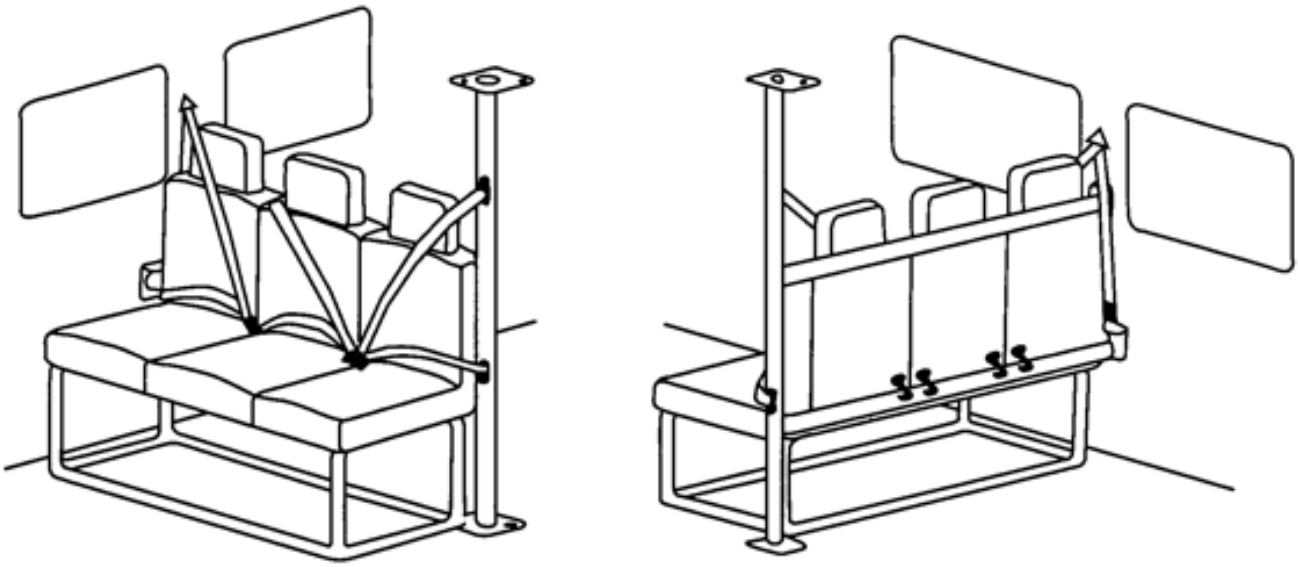
The quoted sizes are for steel reinforcement. Alternative materials may be used as long as they provide comparable strength. A full width reinforcement that's only attached to the thin metal sheet is a reason for failure.

K. Three-point belts will only be accepted if:

10 Seat belt installation check

- the seat has tubular frames or tubular ‘H’ pattern legs, and one of the following is true:
  - the seats have been reinforced (see point I above)
  - the vehicle is fitted with a purpose built structure to which the belts are attached (see Diagram 5)
  - the belts are attached to solid bodywork
- purpose made seats designed with integral three-point belts as standard have been fitted

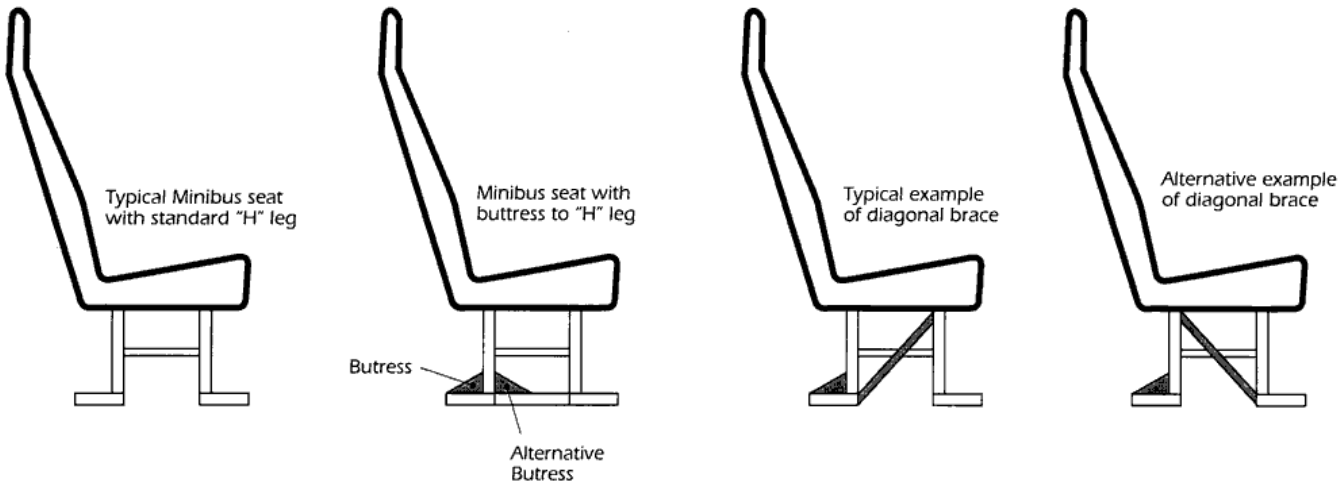
Diagram 5. Purpose built structure



L. If seats with tubular frames or tubular ‘H’ pattern legs have lap belts or three-point belts integral to the seat, the seats must be reinforced.

Such reinforcements include welded metal buttresses, of similar thickness material as the foot, between the foot and the leg (see Diagram 6), and a welded diagonal brace, either in compression or tension, between the foot and the seat base attachment of each leg.

Diagram 6. ‘H’ pattern legs and their reinforcements



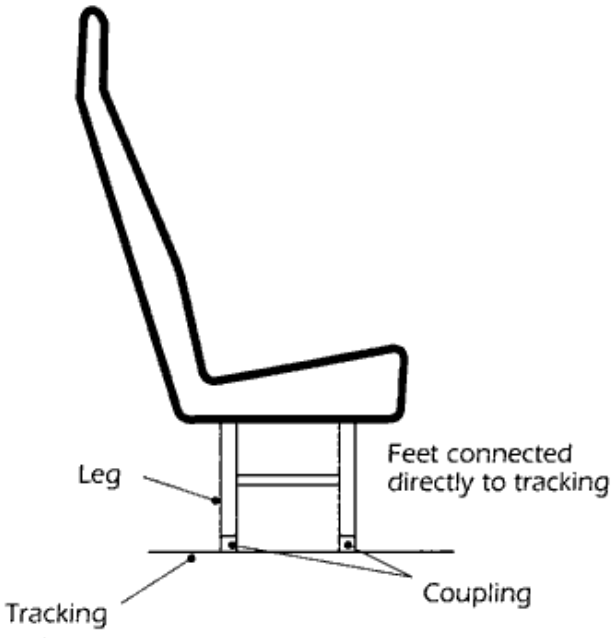
10 Seat belt installation check

Alternatively, the vehicle presenter can show documentary evidence that the installation complies with the Directive 76/115 or ECE Regulation 14.

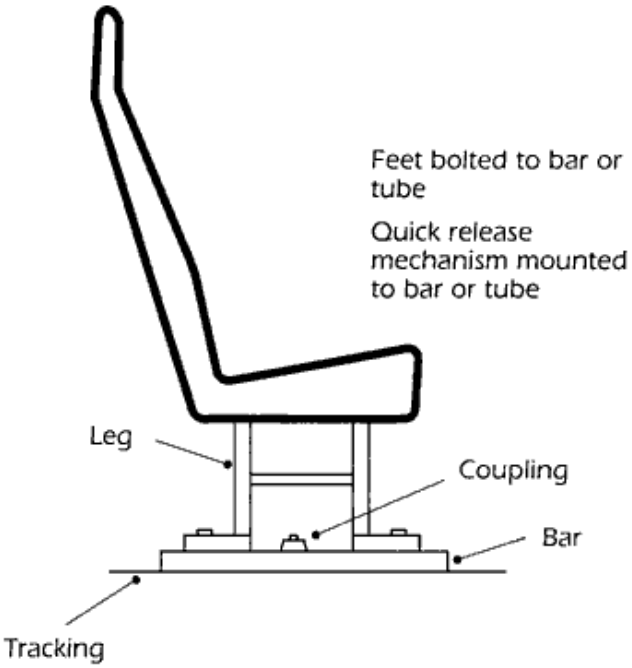
On quick release seats where the feet are mounted directly to tracking by a coupling, it may not be practical to weld a buttress to the leg or a diagonal brace to the foot due to the presence of the coupling (see Diagram 7).

The coupling would prevent any reinforcement being placed in an effective position and the coupling could be damaged by any welding close to it. On this type of installation, the belts can be attached directly to the tracking with quick release mounts or the legs should be modified to use an alternative method of attachment to the tracking.

Diagram 7. Example of quick release seats



Example of quick release seats that may not be suitable for reinforcement



Example of quick release seat that is suitable for reinforcement

On seats where the feet are mounted to a metal bar or tube that's connected to tracking with a quick release coupling, the seat has to be reinforced with buttresses and a diagonal brace as detailed above.

On vehicles with floor mounted seat belts where the belt is anchored close to the seat mounting bolt then the rear foot of each leg must be buttressed to the leg.

M. Vehicles with lap belts must have padding or protection on hard surfaces such as grab rails or seat stanchions, if passengers could hit their heads on them.
The protection doesn't need to cover the full length of a seat grab rail, but it but should cover at least 300mm directly in front of each passenger.

Padding must be compressible, at least 50mm thick and not compress more than 25mm under reasonable thumb pressure. Alternatively, if the padding is 25mm thick, it mustn't compress more than 5mm. Ordinary seat foam or pipe lagging is unlikely to be dense enough.

N. If the belts are attached directly to a metal floor, a load spreading washer must be used between the nut and the floor.

10 Seat belt installation check

The bolt sizes must be as specified in point D above. Typically, this would be 25mm in diameter and 2mm thick. If 2 belts are attached to the same point with a single bolt, then a larger reinforcement plate that is at least 35mm in diameter and 3mm thick, or a rectangular plate that is at least 21×46×3mm, must be used.

The quoted dimensions are for steel reinforcement plates, but alternative materials may be used as long as they are of comparable strength.

Reinforcement plates should follow, as far as practicable, any contours in the floor to which they are attached.

O. If a belt is attached directly to a wooden floor, each anchorage must be reinforced with a plate that is at least 35mm in diameter and 3mm thick or a rectangular plate that is at least 21×46×3mm.

   If 2 belts are attached at the same point with a single bolt, the reinforcement plate must be at least 92mm in diameter and 3mm thick, or a rectangular plate that is at least 65×100×3mm.

   If 2 belts are attached close to each other, 1 reinforcement plate that is at least 92mm in diameter and 3mm thick or a rectangular plate that is at least 65×100×3mm, should be used. This is to make sure that the bolt holes aren't too close to the plate edge.

   Alternatively, 2 steel reinforcement plates may be used as long as they are at least 52mm in diameter and 3mm thick, or rectangular plates that are at least 46×46×3mm.

   The quoted sizes are for steel reinforcement plates, but alternative materials may be used as long as they are of comparable strength. Reinforcement plates should follow, as far as practicable, any contours in the floor to which they are attached.

P. Lower anchorages should be at least 320mm apart. This doesn't need to be the distance between the anchorage points of the belt but it can be between two structural parts of the seat that the belt is routed round.

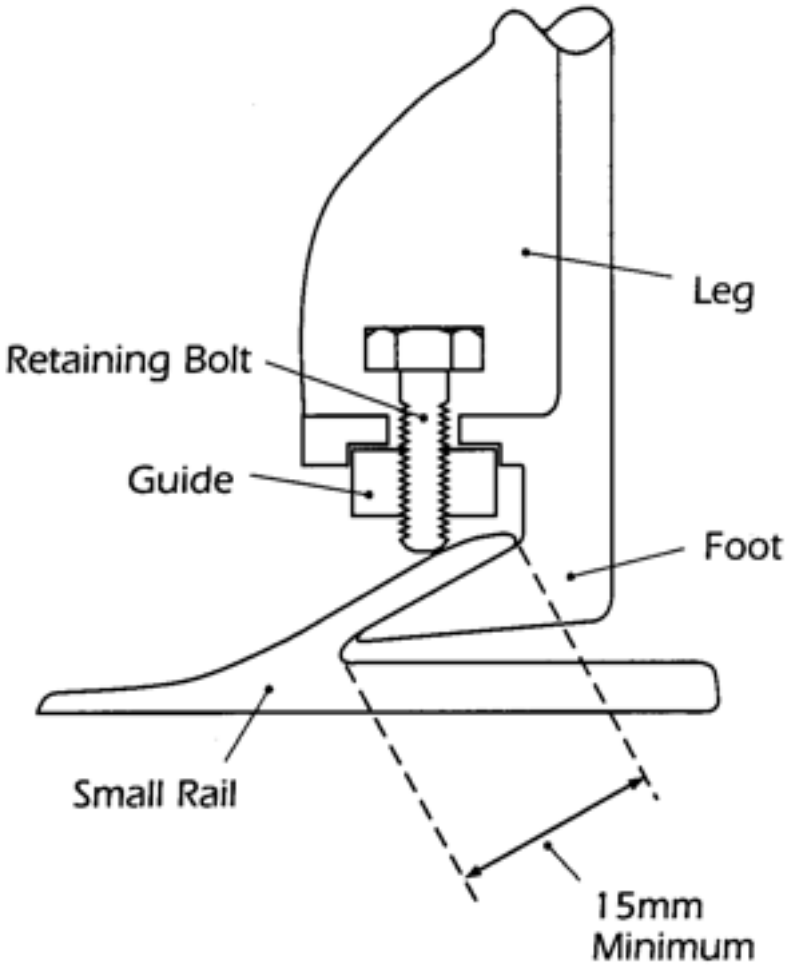
   If the measurement is between mounting bolts it should be measured between the bolt centres.

   You should check that when the belt takes a load, it will not lift or significantly compress the seat cushion. A small amount of compression is acceptable.

   If mounting rails – designed for the adjustment of seat pitch – are fitted and they use an angled claw type clamp (see Diagram 8) with a clamping face of less than 15mm wide, a seat on which a belt is mounted can't only be clamped to the rail.

Diagram 8. Typical angled claw fitting

10 Seat belt installation check



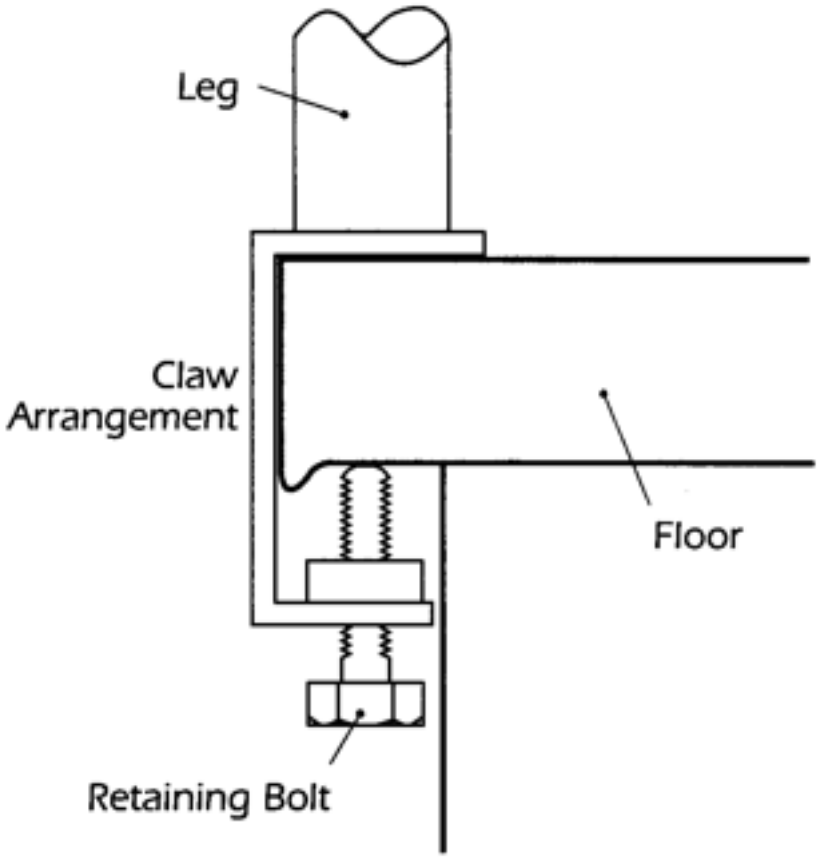
The clamp to the rear foot of each leg must be modified by fitting a bolt through each claw fitting. The bolt must clamp the rear foot of each leg to the rail, floor and a suitable structural member (as in most vehicles).

The bolts must have appropriately sized load spreading washers fitted beneath the bolt head and underneath the retaining nut. A single bolt should be at least 8mm (5/16”) in diameter. Any alternative to this is only acceptable if documentary evidence is provided.

Q. Parallel type claw fittings, for a seat on which a belt is mounted, will be considered satisfactory provided that the securing bolts are fully tightened (see Diagram 9).

Diagram 9. Typical parallel claw fitting

10 Seat belt installation check

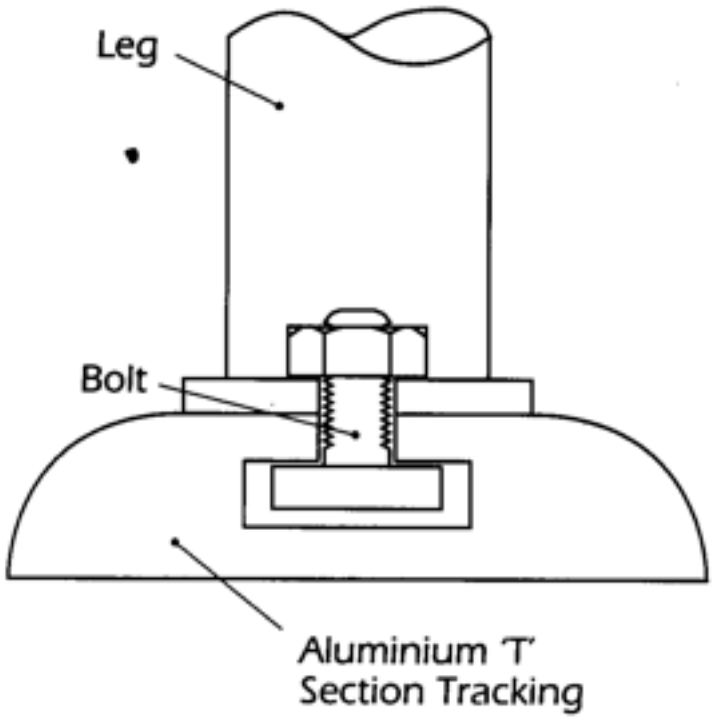


R. If a seat with a mounted belt is bolted to a flat rail, the bolts must pass through the leg, rail, floor and a suitable structural member.

Seats can be attached to a purpose built tracking (see Diagram 2) that is designed for securing seats and wheelchairs. The tracking must be securely attached to the vehicle structure with bolts or fasteners in all the retaining holes or marks provided by the manufacturer.

Diagram 2. Typical 'T' bolt fitting

10 Seat belt installation check



Seats with belts shouldn't be fitted directly to wooden floors unless the floors are reinforced with additional steel reinforcement plates.

Steel reinforcement plates must be at least 92mm diameter and 3mm thick (or a rectangular plate of at least 65×100×3mm). One of them must be fitted between the underside of the floor and the securing nut below the floor of the rear leg, and the other one must be fitted between the leg and the top side of the floor of the front leg.

If the area of the foot of the front leg is larger than 65×100mm, then it's not necessary to have a front reinforcement plate.

S. A 'looped' type seat belt fitting can be used as long as it doesn't float freely along any part of the seat structure. If the seat belt fitting moves freely more than 25mm, it must be failed.

T. The upper anchorage point should be at least 475mm above the height of an uncompressed seat cushion. This dimension should be measured parallel to the backrest.

The upper anchorage point should be at least 110mm from the centre line of the seat back to the side of the seat.

U. A lap belt or the lap section of a three-point belt must be positioned to lie across the wearer's pelvis and not the stomach. This is to reduce the risk of abdominal injury and to prevent the seat occupant from sliding down and under the lap belt. In practise this may result in the belt lying across the top quarter of the thigh.

Seat belt components shouldn't be fitted to seats in such a way that they intrude into the gangway space and passengers are likely to injure themselves by tripping or hitting the component.

Defect	Category
a. evidence that original webbing has been cut and/or reworked; eg belts knotted, fraying or fluffing removed/ sealed by burning etc (see note A)	Major
b. any part of the installation which has a sharp edge which could or is likely to cut or abrade the webbing	Major

10 Seat belt installation check

c.	a directly attached anchorage not secured by standard seat belt mounting bolts and washers as detailed in note D	Major
d.	an anchorage insecure	Major
e.	a tubular seat frame that has been drilled for the purpose of attaching a seat belt (see note F)	Major
f.	a directly attached anchorage not attached to a load bearing member or without suitable reinforcement (see notes I, N and O)	Major
g.	retro-fitted three point belt which is not mounted on a suitable structure (see Diagram 5)	Major
h.	tubular frame legs or tubular “H” pattern legs which have not been reinforced with buttressing and diagonal bracing (see Diagram 6), or buttressing where a floor mounted belt is fitted close to a seat leg	Major
i.	retro-fitted three point belt fitted to a seat on which the leg and frame has not been suitably modified (see note K)	Major
j.	rail or other harsh object without suitable padding as required at note M	Major
k.	lower anchorage’s less than 320mm apart (see note P)	Major
l.	in such a position that loading the belt causes the cushion to be raised or significantly compressed thus allowing the occupant effectively to move forward	Major
m.	an anchorage attached to the floor without reinforcement plates of a suitable size and contour (see notes N and O)	Major
n.	with load spreading washer(s) missing from anchorage bolt	Major
o.	claw type seat mounting with inadequate means of securing claw (see note P)	Major
p.	on a seat fitted to a flat rail the bolt does not pass through the leg, rail, floor, and a suitable structural member, or the floor has not been suitably reinforced	Major
q.	tracking for seats and wheelchairs insecure (see note R)	Major
r.	free movement for a looped belt more than 25mm at the anchorage	Major
s.	upper anchorage of three point belt less than 475mm above uncompressed seat cushion measured parallel to the seat back (see note T)	Major
t.	upper anchorage of three point belt(s) less than 110mm from centre line of seat (see note T)	Major
u.	incorrect positioning of a lap belt or lap section of a three point belt, ie the belt lies across the stomach or forward of the top quarter of the thigh	Major
v.	a seat belt component fitted to a seat significantly intrudes into a gangway and is likely to cause injury to a passenger	Major

Appendix A – Structural integrity and corrosion

Appendix A – Contents

Appendix A – Structural integrity and corrosion

1 Introduction

The effect of corrosion on the safety of a vehicle depends on its extent and the function of the section or component on which the corrosion has occurred.

A relatively small amount of corrosion in an important part of a vehicle structure, where it compromises its load bearing capacity, can make a vehicle unsafe. On the other hand, excessive corrosion on non-structural sections may have little or no effect on the vehicle's safety.

Corrosion of a particular part, such as a door sill, may be very important on one type of vehicle construction, but less important on another. This is highlighted in Diagrams 1 to 4 at the end of this Appendix, where the shaded portions indicate the important load bearing parts of various typical vehicle constructions.

2 Prescribed areas

Certain areas of the vehicle structure are particularly important for the safety of a vehicle and you must pay particular attention to these areas during an inspection. These areas are:

- load-bearing parts of the vehicle to which testable items are mounted – these items are in Sections 1 (brakes), 2 (steering), 5 (axles, wheels, tyres and suspension) and 7 (other equipment) of the inspection manual
- any load-bearing or supporting structure or supporting panelling within 30cm of the mounting location

For example, when examining a seat belt mounting on an inner sill, you must give consideration to the outer sill or the sill reinforcement if the outer sill is a plastic cover, door pillar, floor panel or any other structural part within 30cm of the component's mounting point.

You don't have to check areas covered by things like body trim.

3 Corrosion assessment

Identify the important load bearing members and 'prescribed areas' on a vehicle, then check if they are excessively corroded by:

1 Visual inspection
2 Use finger and thumb pressure to assess the extent of the corrosion
3 If necessary, carefully scrape or lightly tap the affected areas with the corrosion assessment tool

Use of the corrosion assessment tool must be restricted to ascertaining that the failure criteria are met and not used for heavy scraping or poking of the affected areas.

Appendix A – Structural integrity and corrosion

4 Failure criteria within ‘prescribed areas’

You should reject corrosion in prescribed areas if:

- the corrosion has caused a hole in the metal
- the area doesn't feel firm when you press it with your finger and thumb
- your finger or thumb, or a corrosion assessment tool, creates a hole

Any fracture or inadequate repair (see items 11 to 14) within a ‘prescribed area’ should also be rejected.

Modifications or severe distortion within a ‘prescribed area’ should only be rejected if the strength of a component mounting, load bearing member, supporting structure or supporting panelling is significantly reduced.

5 Failure criteria not within ‘prescribed areas’

Structural fractures, deformation or corrosion not within a prescribed area is covered in Section 6 of this inspection manual.

You should only reject these defects if:

- braking or steering is adversely affected due to structural misalignment
- The strength or continuity of a main load-bearing structural member is seriously reduced

See Diagrams 1 to 4 to see the main load-bearing members for different vehicle types.

6 Highly stressed components

The severity of corrosion in highly stressed components, such as steering and suspension arms, rods and levers, can be assessed by lightly tapping or scraping with the corrosion assessment tool.

In places that can't be reached by the corrosion assessment tool, an alternative blunt instrument may be used.

A highly stressed component should be rejected if corrosion has resulted in serious reduction in the overall thickness of the material or has caused a hole or split.

Welded repairs to highly stressed components aren't normally acceptable, other than where the component is made up of sections that are welded together. To pass, the repair should appear to be as strong as the original design.

Appendix A – Structural integrity and corrosion

7 Thin gauge steel pressings

It's common for vehicles to use thin gauge pressings for certain steering and suspension components, mountings, sub-frames and cross members. These are prone to serious and often very localised corrosion.

Corrosion in these components can be difficult to see and may require close inspection.

8 Vehicles with separate bodies

Some vehicle types have bodies and many mechanical components attached to a separate under-frame. The frame is the main load bearing structure with a passenger cell and possibly a separate load bed secured on top of the frame, which may also be load bearing or supportive.

You should only reject excessive corrosion in these structures if:

- it's likely to affect the brakes or steering
- it is within a prescribed area
- body or cab security is significantly reduced

9 General guidance

You can refuse to test a vehicle if excessive deformation or corrosion could result in injury or cause further damage to the vehicle or your testing facility.

You should tell the vehicle presenter about any corrosion or deformation that isn't bad enough to justify rejection.

10 Acceptable methods of repair

Repairs to structural components must be properly carried out and appear to be as strong as the original structure. This requires the use of suitable materials and any plating or welding extends to a sound part of a load-bearing member.

You can only pass spot welded repairs if the original panel was spot welded and the original panel or section has been removed. Stitch or plug welding can be used instead of spot welding.

In all other circumstances, patch repairs must be continuously seam welded.

Some vehicle manufacturers have recommended repair methods that use MIG brazing, a combination of adhesive bonding and riveting, or amalgamations of these with other joining methods. Such repairs are therefore acceptable unless they are clearly inadequate.

Appendix A – Structural integrity and corrosion

11 Unacceptable methods of repair

You can't accept the following bonding processes for repairs to load-bearing members:

- gas brazing
- soldering
- adhesive bonding
- fibre reinforcement
- body filler

If you can't tell which the repair method, you should accept the repair and tell the vehicle presenter.

12 Testable items mounted to plastic structures

Check all testable items that are mounted directly onto plastic structures. This could include steering racks, sub frames and seat belts.

You must fail:

- any cracks, separation or delamination in a prescribed area
- any components where the mounting could become loose or break away

13 Repairs to non-metallic load-bearing structures

Repairs to non-metallic structures in prescribed areas aren't acceptable.

Any other repairs to non-metallic structures must appear to be as strong as the original structure.

14 Panel removal or replacement with different materials

On a vehicle of integral construction, the strength and stiffness of the structure may be seriously affected by any panel being removed or replaced by a panel of different material.

You should reject any modification of panels if:

- it has significantly reduced the original strength and stiffness of a prescribed area
- plastics have been used to replace metal in prescribed areas or load-bearing areas

Appendix A – Structural integrity and corrosion

If you're not sure if a modification has affected the strength or stiffness of a prescribed area, you should accept the modification and tell the vehicle presenter.

15 Diagrams to show main load bearing areas

Diagram 1. Chassis with coil spring suspension

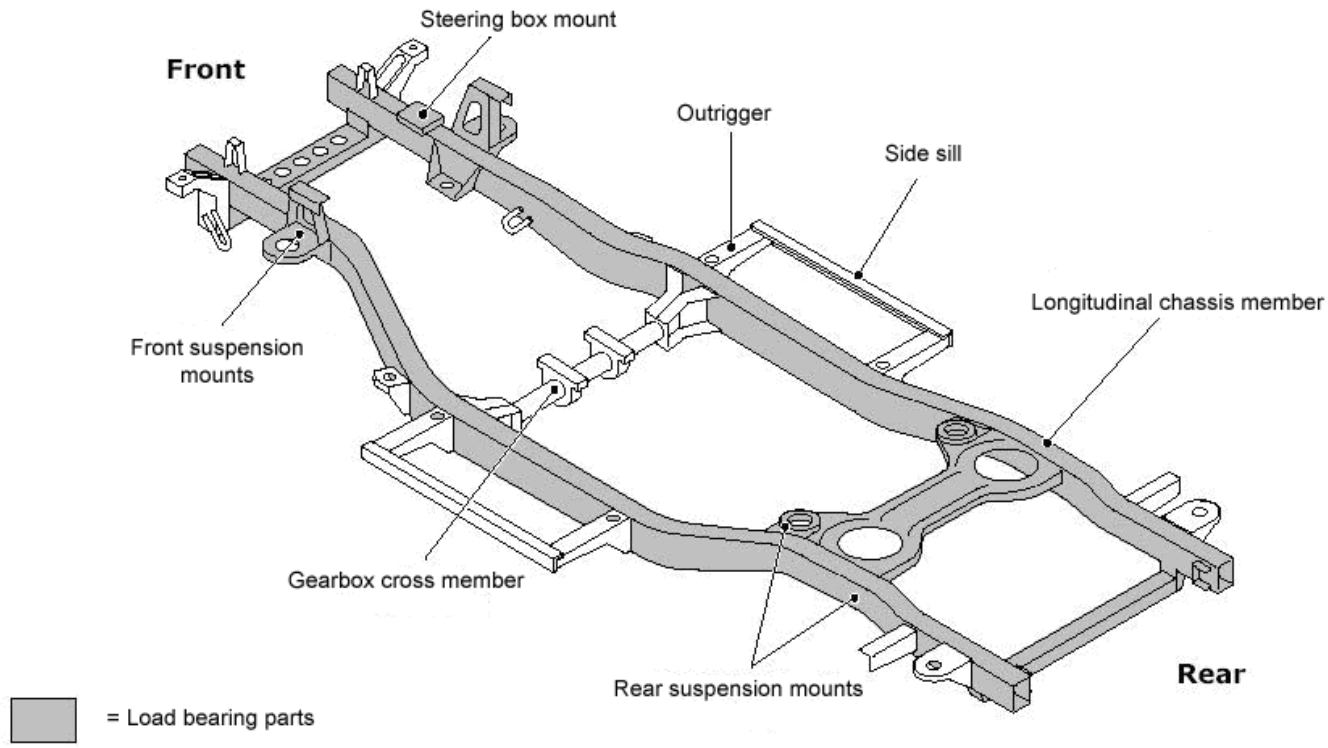


Diagram 2. Chassis with leaf spring suspension

Appendix A – Structural integrity and corrosion

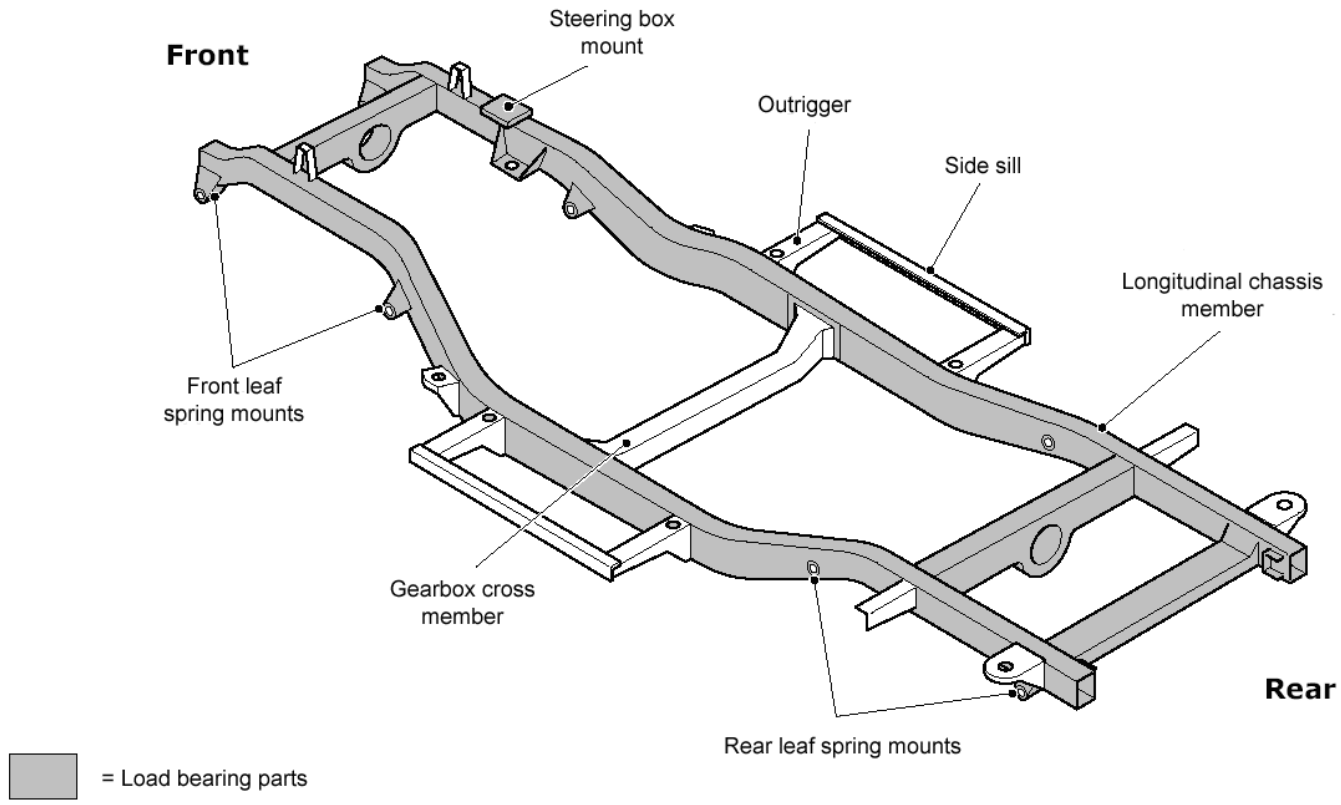
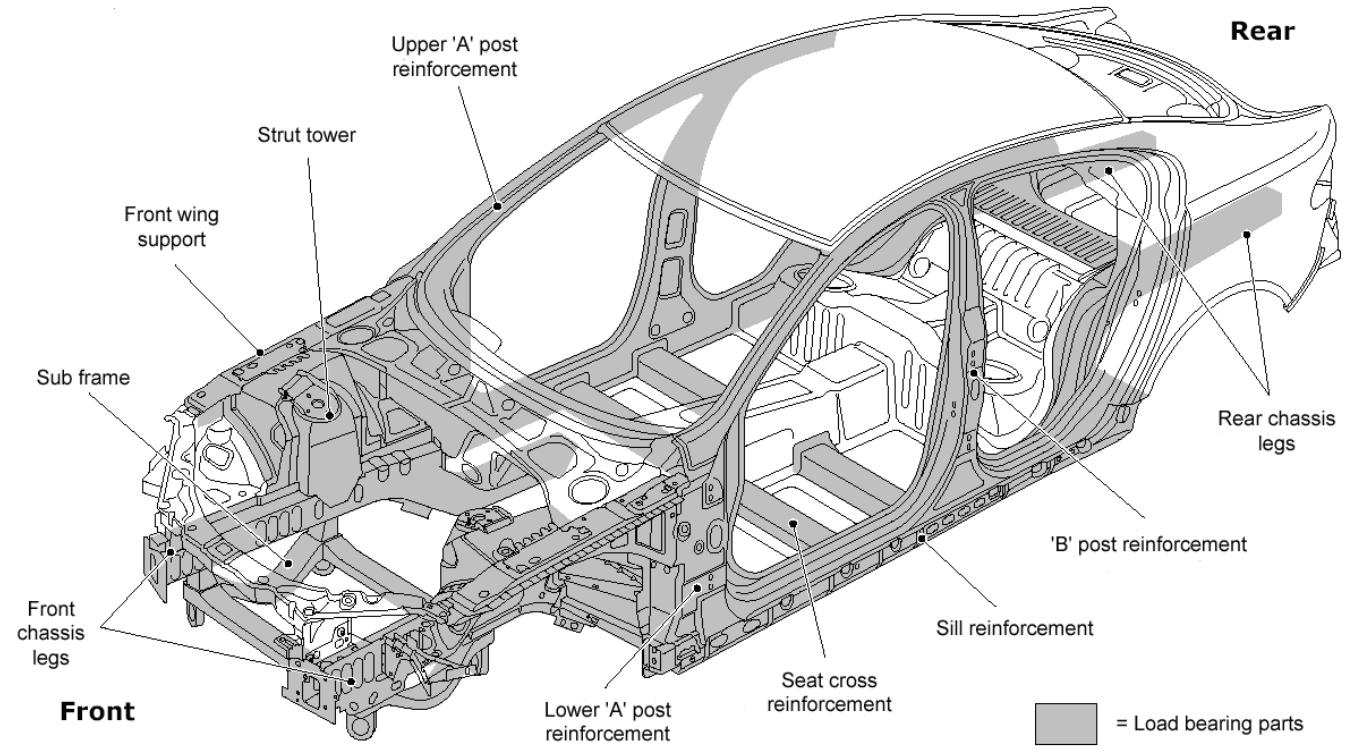
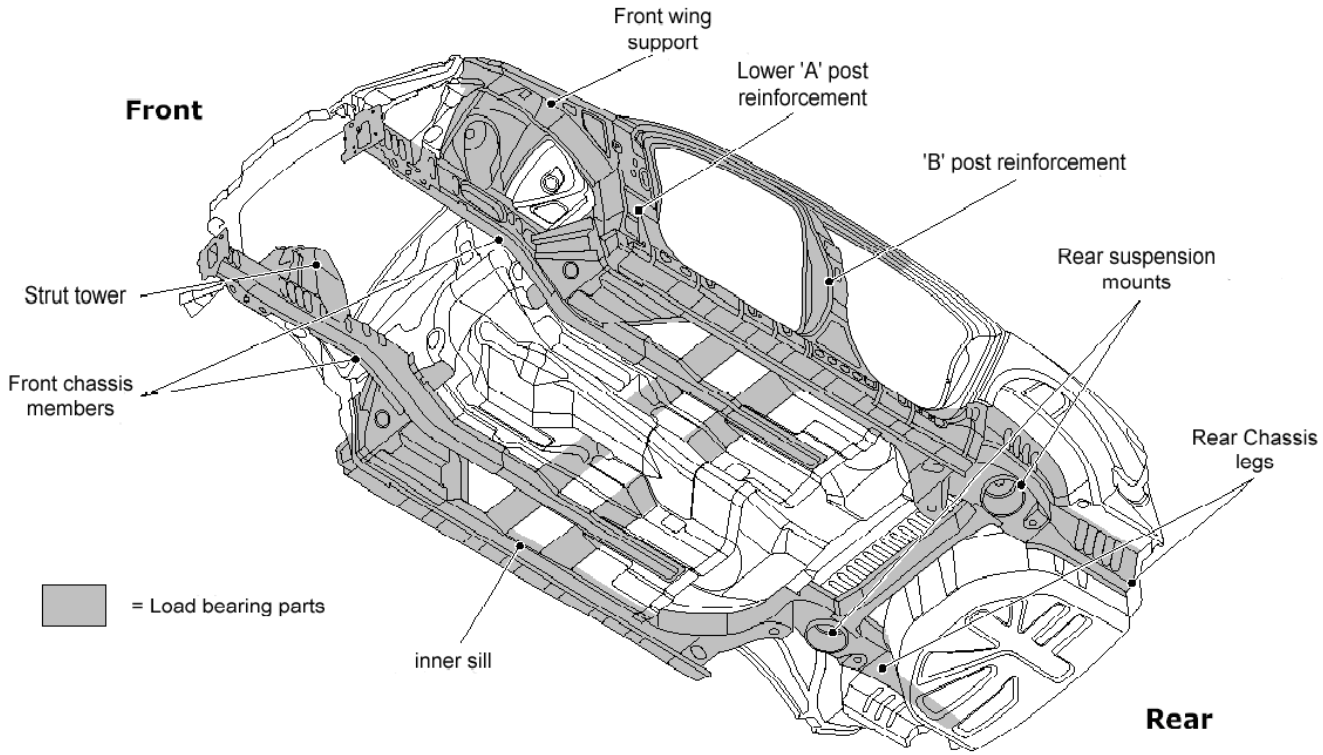


Diagram 3. Structural body components



Appendix A – Structural integrity and corrosion

Diagram 4. Structural body components, from underneath



Appendix B – Tyre load index tables

Appendix B – Tyre load index tables

Load rating

Check the manufacturer's plate to find the maximum laden weight of an axle. You must check that the tyres fitted have a load rating that can carry the laden weight of the axle.

Exceptions

If the manufacturer's plate doesn't show the laden weight of the axle, you can assume the tyres are suitable, unless it's beyond doubt that they're not suitable.

If a Class 5 or 7 vehicle has a ‘ministry’ plate, you should use the lower axle weight not to be exceeded in Great Britain shown on the 'ministry' plate rather than the laden weight shown on the manufacturer's plate.

If a tyre isn't marked with a load index, you must assume it meets the load capacity requirements.

Tyre load index table

The tyre load index table displayed below shows the load rating for both single wheel and dual wheel configurations, for example 121/120 = 2,900 single, 5,600 dual.

If a tyre has only one load index marked, then that index refers to use in single formation. Such tyres can be used in dual formation by applying the following formula:

Maximum load shown × 1.91 = dual formation maximum load

Appendix B – Tyre load index tables

Load index table

Load index	Single kg	Dual kg		Load index	Single kg	Dual kg		Load index	Single kg	Dual kg
70	670	1340		110	2120	4240		150	6700	13400
71	690	1380		111	2180	4360		151	6900	13800
72	710	1420		112	2240	4480		152	7100	14200
73	730	1460		113	2300	4600		153	7300	14600
74	750	1500		114	2360	4720		154	7500	15000
75	774	1548		115	2430	4860		155	7750	15500
76	800	1600		116	2500	5000		156	8000	16000
77	824	1648		117	2570	5140		157	8250	16500
78	850	1700		118	2640	5280		158	8500	17000
79	874	1748		119	2720	5440		159	8750	17500
80	900	1800		120	2800	5600		160	9000	18000
81	924	1848		121	2900	5800		161	9250	18500
82	950	1900		122	3000	6000		162	9500	19000
83	974	1948		123	3100	6200		163	9750	19500
84	1000	2000		124	3200	6400		164	10000	20000
85	1030	2060		125	3300	6600		165	10300	20600
86	1060	2120		126	3400	6800		166	10600	21200
87	1090	2180		127	3500	7000		167	10900	21800
88	1120	2240		128	3600	7200		168	11200	22400
89	1160	2320		129	3700	7400		169	11600	23200
90	1200	2400		130	3800	7600		170	12000	24000
91	1230	2460		131	3900	7800		171	12300	24600
92	1260	2520		132	4000	8000		172	12600	25200
93	1300	2600		133	4120	8240		173	13000	26000
94	1340	2680		134	4240	8480		174	13400	26800
95	1380	2760		135	4360	8720		175	13800	27600
96	1420	2840		136	4480	8960		176	14200	28400
97	1460	2920		137	4600	9200		177	14600	29200
98	1500	3000		138	4720	9440		178	15000	30000
99	1550	3100		139	4860	9720		179	15500	31000
100	1600	3200		140	5000	10000				
101	1650	3300		141	5150	10300				
102	1700	3400		142	5300	10600				
103	1750	3500		143	5450	10900				
104	1800	3600		144	5600	11200				
105	1850	3700		145	5800	11600				
106	1900	3800		146	6000	12000				
107	1950	3900		147	6150	12300				
108	2000	4000		148	6300	12600				
109	2060	4120		149	6500	13000				

Appendix C – Seat belt fitment tables

Seat belt fitment tables

Table 1. Three-wheeled vehicles first used before 17 June 1999

Date of first use	Unladen weight	Number of forward facing rear seats	Seat belt fitment
before 1 January 1965	n/a	n/a	none
on or after 1 September 1970	255kg or less	n/a	none
	more than 255kg*	n/a	A, F and M
before 1 April 1981	more than 410kg	n/a	A, F and M
before 1 April 1987	more than 410kg	n/a	B, F and M
on or after 1 April 1987	more than 410kg	2 or fewer	B, G and N
		more than 2	B, G and O

*If an amateur built vehicle has less than 410kg unladen weight and a driving seat of a type that the driver sits astride, it doesn't need a seat belt.

Table 2. Tricycles and quadricycles first used on or after 17 June 1999

Seat	Belt requirements
driver's seat	Three-point lap and diagonal belt (may be static or inertia), harness belt or disabled persons belt
outboard (front) passenger seat	Three-point lap and diagonal belt (may be static or inertia), harness belt or disabled persons belt
centre front seat	Lap belt, three-point lap and diagonal belt (may be static or inertia), harness belt or disabled persons belt
forward facing rear seats *	Lap belt, three-point lap and diagonal belt (may be static or inertia), harness belt, disabled persons belt or child restraint

* Includes outboard forward-facing seats fitted to un-bodied tricycles.

Seat belts aren't needed for:

- three-wheeled mopeds
- quadricycles that have an unladen weight not more than 250kg
- tip-up occasional seats
- a sit astride, saddle type driver's seat on unbodied tricycles or quadricycles
- any sit astride, saddle type passenger seat that's immediately in front or behind the driver in a longitudinal plane

Appendix C – Seat belt fitment tables

Some unbodied vehicles may have been 'type approved' without seat belts. You can accept these if there's evidence that they're type approved to 92/61/EEC or 2002/24/EC. This information is usually written on the manufacturer's plate.

Passenger vehicles, motor caravans and ambulances up to 8 passenger seats

A 'passenger vehicle' is a vehicle constructed solely for the carriage of passengers and their effects.

A 'motor caravan' is a motor vehicle which is both:

- constructed or adapted for the carriage of passengers and their effects
- permanently installed with equipment and facilities which are reasonably necessary to enable the vehicle to provide mobile living accommodation

Motor caravans are in Class 4 or 5 depending on their seating capacity. Size or weight doesn't determine which class the motor caravan is in.

An 'ambulance' is a motor vehicle that's both:

- specially designed and constructed (and not merely adapted) for carrying as equipment permanently fixed to the vehicle, equipment used for medical, dental, or other health purposes
- used primarily for the carriage of persons suffering from illness, injury or disability

Table 3. Driver's and specified front passenger seat belts

Seat belt type	Description
A	Belt which restrains the upper part of the body (but need not include a lap belt)
B	Three-point belt or disabled person's belt
C	Any of the following: • three-point inertia reel belt • retractable lap belt • disabled person's belt • child restraint (not driver's seats)
D	For the driver's seat, any of the following: • three-point belt • lap belt • disabled person's belt There is no requirement for the specified front passenger seat to have a belt.
E	Any of the following: • three-point inertia reel belt • disabled person's belt • child restraint (not driver's seats)

Appendix C – Seat belt fitment tables

Table 4. Other forward-facing front passenger seats belts

Seat belt type	Description
F	none
G	Any of the following: • three-point belt • lap belt • disabled person's belt
H	Any of the following: • three-point inertia reel belt • lap belt • disabled person's belt
J	Any of the following: • three-point inertia reel belt • retractable lap belt • disabled person's belt • child restraint
K	Three-point belt or lap belt
L	Any of the following: • three-point inertia reel belt • disabled person's belt • child restraint

Table 5. Rear seat belts

Seat belt type	Description
M	none
N	In forward facing rear seats: A three-point inertia reel belt in at least one seat, or any of the following in both seats: • three-point belt • lap belt • disabled person's belt
O	In forward facing rear seats any of the following: • three-point inertia reel belt on an outboard seat and a three-point static or inertia reel belt, lap belt, disabled persons belt or child restraint for at least one other seat • static three-point belt for one seat and a disabled person's belt or child restraint for at least one other seat • three-point belt, lap belt, disabled person's belt or child restraint to each seat
P	In forward and rearward facing rear seats any of the following: • three-point inertia reel belt

Appendix C – Seat belt fitment tables

	• disabled persons belt • child restraint
Q	Any of the following: • three-point inertia reel belt • retractable lap belt • disabled person's belt • child restraint
R	Any of the following: • three-point inertia reel belt • retractable lap belt • disabled person's belt • child restraint Note: Retractable lap belts may be fitted on any exposed seat where there are no seats or surfaces directly in front. They are acceptable on non-exposed seats only if an appropriate energy absorbing seat or surface is present in front.
S	In exposed forward facing seats (any rear seat which isn't immediately behind a forward facing seat), a three-point belt or lap belt
T	In forward facing rear seats any of the following: • three-point inertia reel belt • disabled person's belt • child restraint

Passenger vehicles, motor caravans and ambulances with up to 8 passenger seats

Table 6. Seatbelt fitments for vehicles with an unladen weight of 2,540kg or less

Date of first use	Forward facing rear seats	Seat belt fitment
before 1 Jan 1965	n/a	none
before 1 April 1981	n/a	A, F and M
before 1 April 1987	n/a	B, F and M
on or after 1 April 1987	2 or fewer	B, G and N
	more than 2	B, G and O

Appendix C – Seat belt fitment tables

Table 7. Seatbelt fitments for vehicles with an unladen weight more than 2,540kg

Date of first use	Forward facing rear seats	Design gross weight	Seat belt fitment
before 1 October 1988	n/a	n/a	none
before 1 October 2001	2 or fewer	n/a	B, G and N
	more than 2	3,500kg or less	B, G and M
		more than 3,500kg	none
on or after 1 October 2001	n/a	3,500kg or less	B, L and T
		more than 3,500kg	C, J and R

Minibuses, motor caravans and ambulances with 9 to 16 passenger seats

A ‘minibus’ is a motor vehicle constructed or adapted to carry more than 8, but no more than 16 seated passengers.

A ‘motor caravan' is a motor vehicle which is both:

- constructed or adapted for the carriage of passengers and their effects
- permanently installed with equipment and facilities which are reasonably necessary to enable the vehicle to provide mobile living accommodation

Motor caravans are in Class 4 or 5 depending on their seating capacity. Size or weight doesn’t determine which class the motor caravan is in.

An ‘ambulance’ is a motor vehicle that’s both:

- specially designed and constructed (and not merely adapted) for carrying as equipment permanently fixed to the vehicle, equipment used for medical, dental, or other health purposes
- used primarily for the carriage of persons suffering from illness, injury or disability

Table 8. Seatbelt fitments for minibuses, motor caravans and ambulances with 9-16 passengers

Date of first use	Weight	Passenger seats	Seat belt fitment
before 1 Jan 1965	n/a	n/a	none
before 1 October 1982	ULW 2,540kg or less	9 - 16	A, F and M
	ULW more than 2,540kg	9 - 16	none
before 1 October 1988	ULW 2,540kg or less	9 - 16	B, F and M
	ULW more than 2,540kg	9 - 16	none
before 1 October 2001	DGW 3,500kg or less	9 - 16	B, G and M
	DGW more than 3,500kg	9 - 16	none
on or after 1 October 2001	DGW 3,500kg or less	9 - 12	B, L and T
		13 - 16	C, L and T
	DGW more than 3,500kg	9 - 16	C, J and R

Appendix C – Seat belt fitment tables

Coaches

A ‘coach’ is a motor vehicle constructed or adapted to carry more than 16 seated passengers, with a DGW of more than 7,500kg and a maximum speed in excess of 60mph.

Table 9. Seatbelt fitments for coaches

Date of first use	Seat belt fitment
before 1 October 1988	none
before 1 October 2001	D, G and S
on or after 1 October 2001	C, J and R

Other buses, except those designed for urban use with standing passengers

A ‘bus’ is a motor vehicle which is constructed or adapted to carry more than 8 seated passengers (see also 'minibus').

Table 10. Seatbelt fitments for other buses

Date of first use	Design gross weight	Seat belt fitment
before 1 October 2001	n/a	none
on or after 1 October 2001	DGW 3,500kg or less	E, L and T
	DGW more than 3,500kg	C, J and R

Goods vehicles

A ‘goods vehicle’ is a motor vehicle constructed or adapted for use for the carriage or haulage of goods or burden of any description.

Table 11. Seatbelt fitments for goods vehicles

Date of first use	Unladen weight	Seat belt fitment
before 1 April 1967	n/a	none
before 1 April 1980	more than 1,525kg	none
	1,525kg or less	A, F and M
before 1 April 1981*	n/a	A, F and M
before 1 April 1987*	n/a	B, F and M
on or after 1 April 1987	n/a	B, G and M

*Except a model of vehicle manufactured before 1 October 1979 and first used before 1st April 1982.