

Testing Directive

Changes to vehicle testing: STEERING AND SUSPENSION

Introduction

This is the second in a series of Technical Pen Pictures that looks at the changes VOSA will be implementing as a result of the new Testing Directive.

The minimum requirements for MOT testing (Periodic Technical Inspection in Europe) have long been enshrined in European law, which requires that every EU Member State has an equivalent of our own MOT test for vehicles of a testable age. The legislation applies to trucks, buses, cars and light goods vehicles, but not to category 'L' vehicles which includes motorcycles and quadricycles.

The Framework Directive which covers the technical requirements of the test was recast in 2009 and introduces a number of mandatory new testable items, mainly as a result of the increased number of electrical safety systems fitted to modern vehicles, but also to further harmonise the test across the EU.

The majority of these changes must be implemented by each Member State by 31st December 2011, while changes to brake performance requirements can be delayed until the end of 2013.

To facilitate the required changes, VOSA has been liaising with the Department for Transport and the European Commission to establish the extent of the changes necessary and to implement them with minimal impact in respect of increase in the time to carry out the test, the maximum test fee and the new equipment necessary.



MOT Changes to Inspection Manual

- Section 2 (Steering and Suspension)

This Technical Pen Picture gives an overview of the MOT test changes in respect of steering and suspension checks brought about by an amendment to Annex II to Directive 2009/40/EC and introduced by Commission Directive 2010/48/EU.

These changes will take effect from 1 January 2012.



Section 2.1 – Steering Control

The law requires vehicles to be fitted with some sort of anti-theft mechanism to provide minimum security protection. Commonly this is achieved by the fitment of steering locks, transmission locks, or gearshift locks.

For testing purposes, the Directive only concerns itself with steering locks, and a check on the presence and operation of the steering lock mechanism, where one was fitted as standard, has therefore been added to this Section.

Testers are required to check that the mechanism doesn't inadvertently engage, but this is effectively already carried out during the 'lock to lock' check. However, to check that the steering lock operates as intended, it will generally be necessary to remove the ignition key and turn the steering wheel sufficiently to engage the lock.

Section 2.2 – Steering System

Repairs by welding or evidence of excessive heat having been applied to steering components and structural members have long been Reasons for Rejection. However, this is updated to include any inappropriate repair or modification to a steering component.

Guidance on what constitutes an 'inappropriate repair or modification' has been added to the Introduction Section, where it states:

“Repairs and modifications to vehicles must be assessed on their merits, taking account of the nature and function of the component.

The main criterion to be used when assessing repairs is whether the repair is obviously likely to adversely affect the roadworthiness of the vehicle. In respect of modifications, the main criterion should be whether the modification has seriously weakened the component.”

Before the days of MOT Computerisation, many testers incorrectly failed steering and suspension ball joints if the dust cover was split or missing. Well now they will be able to correctly fail them as the Directive requires that these are now included in the test; therefore if a ball joint dust cover is missing or no longer prevents the ingress of dirt etc. it will be a Reason for Rejection (RfR).

Sub-section D concerns the steering lock to lock check and sees two additional checks. A significant oil leak from a steering box becomes a Reason for Rejection as does a missing steering lock stop, where fitted as standard. Not too many light vehicles are fitted with external lock stops, so this is likely to mainly affect those testing larger Class 5 vehicles.

Section 2.3 – Power Steering

Power steering checks now include that the fluid level is not below the minimum requirement. However, there is no requirement to remove the reservoir cap, so the check only applies where the fluid level is visible in the reservoir.

As with the rest of the steering, any inappropriate repair or modification to a power steering component will result in a failure, so a pair of tights in place of the drive belt will not be acceptable! Serious misalignment or fouling of power steering components also becomes an RfR.

Fluid pipes were already subject to inspection for damage and fouling, but will now also be rejected should they be excessively corroded.

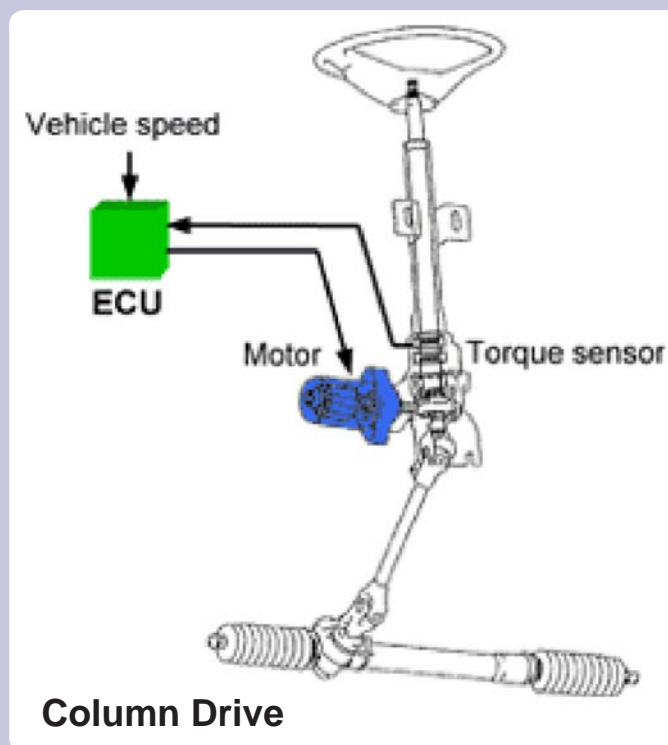
Electronic Power Steering is becoming increasingly popular with vehicle manufacturers and, as is usual with electronic systems, a malfunction indicator lamp (MIL) is fitted to warn the driver of a problem. Where such a lamp is illuminated, indicating a failure in the system, this will be a Reason for Rejection.

Electronic Power Steering (EPS or EPAS) is designed to use an electric motor to reduce effort by providing steering assist to the driver of a vehicle. Sensors detect the motion and torque of the steering column, and a computer module applies assistive torque via an electric motor coupled directly to either the steering gear or steering column. This allows varying amounts of assistance to be applied depending on driving conditions.

The system allows engineers to tailor steering-gear response to variable-rate and variable-damping suspension systems achieving an ideal blend of ride, handling, and steering for each vehicle. On Fiat group cars the amount of assistance can be regulated using a button named “CITY” that switches between two different assist curves, while most other EPS systems have variable assist, which allows for more assistance as the speed of a vehicle decreases and less assistance from the system during high-speed situations. In the event of component failure, a mechanical linkage such as a rack and pinion serves as a back-up in a manner similar to that of hydraulic systems. Electric power steering should not be confused with drive by wire or steer-by-wire systems which use electric motors for steering, but without any mechanical linkage to the steering wheel.

Electric systems have a slight advantage in fuel efficiency because there is no belt-driven hydraulic pump constantly running, whether assistance is required or not, and this is a major reason for their introduction. Another major advantage is the elimination of a belt-driven engine accessory, and several high-pressure hydraulic hoses between the hydraulic pump, mounted on the engine, and the steering gear, mounted on the chassis. This greatly simplifies manufacturing and maintenance. By incorporating electronic stability control electric power steering systems can instantly vary torque assist levels to aid the driver in evasive manoeuvres.

The first electric power steering systems appeared on the Honda NSX in 1990, the FIAT Punto Mk2 in 1999, the Honda S2000 in 1999, and on the BMW Z4 J in 2002. Today a number of manufacturers use electric power steering.



Section 2.4 – Suspension - General

Some vehicles are fitted with rubber/synthetic spring assistors, either as original equipment or an optional extra, particularly on motorhome conversions. There have been occasions where these assistors have been confused with bump stops, and because they are in contact with the axle, they have been incorrectly failed. As a result, guidance has been added to the Information column to raise awareness of these components.

As previously mentioned in relation to steering, suspension ball joint dust covers have become testable items and will fail if they no longer prevent the ingress of dirt etc. as has an inappropriate repair or modification to a suspension component. Testers should consider the guidance in the Information column and the Introduction section before rejecting modified or repaired components. Additionally, where unacceptable repairs were previously covered in a number of sub-sections, these are now all covered by a single RfR.

Rear drive shafts, where they form part of the suspension, were already testable items, but as a result of the Directive there are now some additional checks. Drive shaft support bearings, where fitted, must now be checked for excessive wear; additionally, drive shaft coupling gaiters missing, or in such a condition that they no longer prevent the ingress of dirt, also become Reasons for Rejection.

Section 2.5 – Front Suspension, Wheel bearings and Drive Shafts

As for rear drive shafts that form part of the suspension, front drive shaft support bearings and inner coupling gaiters also become testable. The RfR wording for gaiters has also been changed to cover all aspects of the gaiter failing to prevent the ingress of dirt. Front to rear propshafts still remain outside the scope of the test.

HGV and PSV Changes to Steering and Suspension Inspection

This Technical Pen Picture gives an overview of the HGV and PSV test changes in respect of steering and suspension checks brought about by an amendment to Annex II to Directive 2009/40/EC and introduced by Commission Directive 2010/48/EU.

Unless otherwise stated, these changes will take effect from 1 January 2012.



IM Section 48 – Suspension

There are two revisions in this part of the Inspection Manual. The first revision adds a method of inspection and reason for failure for a new test component – Dust Covers. The addition of this test item is in line with the Testing Directive. The Directive simply mandates for a test item in connection with suspension joints, therefore this test item fits with the method of inspection for 'all suspension types' What constitutes a dust cover will invoke much deliberation but it should be considered in the context of the ability to retain a lubricating medium and prevent the ingress of dirt into the lubricant. In the last Pen Picture we identified that additional Reason for Rejection has been added for a brake actuator dust cover missing, insecure or damaged so that it no longer prevents the ingress of dirt. This reason for failure is replicated from that standard.

The second change in this section is a change that only relates to air/fluid suspension systems. A method of inspection and reason for rejection has been added to prevent the modification of only these types of suspension where it affects the system function.

IM Section 54 – Steering

The new Testing Directive is designed to facilitate checks on modern vehicle systems and this section has been changed to future proof for vehicle designs that use electronic power steering. Traditional air or fluid power steering systems have been used in large vehicle schemes for many years and we do not expect many sites will see electronic power steering systems except perhaps fitted to light commercial vehicles. Check out the text in the MOT Scheme Pen Picture for further information on this item. As a result of this we have changed the title header of this section to include all types of power steering systems.

An additional check requirement is inserted in relation to the hydraulic fluid content level. We have further stated that this check is confined to a visual check and the notes state, the hydraulic fluid level check only applies to those reservoirs which can be checked without removing the reservoir cap.

This section also includes a reason for failure that relates to a power steering system that has been subjected to an inappropriate repair or modification. The fail standard for this test item mirrors that of the method of inspection.

Power steering cables, hoses and the electronic power steering malfunction indicator light illuminated indicating a fault exists become testable items. The check continues to be in line with VOSA procedures identified by the appropriate Inspection Manual. For clarity it is repeated here:

The procedures given here assume that only parts of a vehicle which can readily be seen without dismantling are to be examined. However, it may be necessary to ask the driver to remove wheel embellishers or panels where it is not otherwise possible to inspect safety critical items.

Vehicle combinations will not normally be separated for the purposes of the test although it will be necessary to disconnect and re-connect the air lines as directed.

Changes have been made to the Manual to require examiners to identify if the steering lock stop(s) is fulfilling its function. Examiners are reminded that in some cases there is provision for extra lock stops which are not standard item and where two are fitted only one needs to fulfil the function on **each lock**.

There are three final changes to the Inspection Manual. These are the inclusion of dust covers in line with suspension dust covers; the addition of a check for steering system leaks and finally if the steering gear casing is fractured. VOSA have not agreed with Industry the standard to be applied for a steering system leak as the consequences are different from our traditional check for oil leaks – Inspection Manual Item 44. We will update you in the final Pen Picture on outstanding items.



Visit our websites:

for commercial customers

www.businesslink.gov.uk/transport

for private motorists

www.direct.gov.uk

for corporate information

www.dft.gov.uk/vosa

Contact us:

E-mail

enquiries@vosa.gov.uk

National Number

0300 123 9000*

Monday to Friday - 7.30am until 6.00pm
(normal working hours)

**Calls provided by BT are charged at a low rate. Charges from other providers may vary.*

VOSA/PSP/2167B/FEB11