8.2.2.2 Opacity

This inspection does not apply to tricycles, 'L' category vehicles or electric/combustion engine (Hybrid) vehicles.

Pre-1980 vehicles are only subject to a visual inspection of emitted smoke at both idle and during free acceleration.

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. Reference to the smoke meter manufacturer's instructions may be necessary.

Do not carry out a smoke test if the engine is not in a safe condition to do so. It is important to establish it is safe by questioning the vehicle presenter and carrying out a brief examination of the engine. The smoke test should not 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 it is considered unsafe to conduct the smoke test, the reason for refusing to carry out the test must be clearly shown on the VT30 (see Introduction 4h).

On pre-1980 vehicles the engine should be at its normal operating temperature. This may be established by, for example, the temperature gauge, cooling fan cut in or hot coolant hoses.

Post 1980 vehicles are subject to an instrumented smoke test and it is important to ensure the engine is at least 80 °C or normal operating temperature if lower, before carrying out the test. This should be achieved by use of an engine oil temperature probe or other approved device.

Alternatively, if owing to vehicle configuration, or where this measurement is impractical, the establishment of the engine's normal operating temperature may be made by other means, for example by the operation of the engine cooling fan. It is not normally sufficient to run the engine with the vehicle stationary to warm it up to temperature.

When testing vehicles fitted with automatic transmission care must be taken to avoid overheating the transmission system. Do not carry out unnecessary engine acceleration or prolonged high revving of the engine. Reference to the vehicle manufacturer's instructions may be necessary.

If a vehicle has a dual exhaust system, then the smoke test must be repeated and the emissions from the tailpipes averaged. This is done by adding together the readings and dividing by two, for example:

1st pipe emits smoke level of $1.50m^{-1}$

2nd pipe emits smoke level of $1.00m^{-1}$

Average smoke level is: $\frac{1.5 + 1.0}{2} = 0.75m^{-1}$

A dual exhaust system has two separate pipes from the engine manifold to the tailpipes. Even if there is a balance tube between the separate pipes it is still considered a dual exhaust.

Maximum engine revs cannot be achieved on some vehicles due to design features. Where 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.

Where no reading can be obtained or the DSM shows an error, the printout should be marked accordingly showing that the emissions limits were tested and met but the DSM could not register the reading.