

TEST PROCEDURE FOR PRIVATE EMISSION TESTING CENTER

Free Acceleration test for in use compression ignition motor vehicles

1. Scope

The test is a smoke opacity measurement for in use motor vehicles equipped with compression ignition (diesel) engines, using the free acceleration from low idle speed method.

2. Motor Vehicle test condition

- 2.A. The test shall be carried out on a stationary vehicle and the engine shall be first brought to normal operating conditions during a road run or dynamic test. In particular, cooling water and oil should be at normal temperature.
- 2.B. The combustion chamber should not have been cooled or fouled due to a prolonged period of idling preceding the test.
- 2.C. The exhaust system shall not have any orifice or leaks wherein the gases emitted by the engine might be diluted.

3. Test equipment

The light absorption coefficient of the exhaust gases shall be measured with an opacimeter satisfying the conditions laid down in ECE Regulation No. 24, Revision 2E/ECE/TRANS 505. Rev Add 23 Rev 2, Annex 8: Characteristics of Opacimeter.

4. Test procedures and smoke opacity measurement

- 4.A. Follow the opacimeter manufacturer's instruction for on the proper installation, operation / use and checking the accuracy and calibration before and after each test.
- 4.B. Set the vehicle gear change control in the neutral position and the hand brake effectively engaged.
- 4.C. Start the engine and warm it up to its normal operating temperature.
- 4.D. Accelerate the engine two to three times (2-3) prior to smoke sampling in order to remove deposits of soot and other carbon particles in the tail pipe.
- 4.E. With the engine idling, depress the accelerator quickly, but not violently to obtain maximum delivery from the injection pump. Maintain this position until maximum engine speed is reached for about two (2) to four (4) seconds and the governor comes into action. As soon as this speed is reached, release the accelerator until the engine resumes its idling speed. Record the maximum reading of the smoke meter.
- 4.F. The operation described in paragraph (4)(E) shall be repeated not less than six (6) times in order to clear the exhaust system and to allow for any necessary adjustment of the apparatus. The maximum opacity values read in each successive acceleration shall be noted until stabilized values are obtained. The values read shall be regarded as stabilized when four (4) consecutive readings are within a band width of 0.25 m-1 and do not form a decreasing sequence. The arithmetic mean of the four stabilized values shall be the test result for the concerned vehicle.
- 4.G. For motor vehicles designed with several exhaust outlets that are individually connected from paired exhausted ports, the free acceleration test shall be carried out on each outlet. In this case, the values used for calculating the correction to the absorption coefficient shall be arithmetical mean values recorded at each outlet and the test shall be valid only if the extreme values measured do not differ by more than 0.15m-1

For motor vehicles designed with several exhaust outlets connected from one exhaust pipe coming from the engine's exhaust manifold collector, the free acceleration test shall be carried out only on one exhaust outlet, the other outlets effectively blocked to prevent leaks.

- 4.H. Seal the full load screw of the injection pump / delivery system of the motor vehicle after a pass test to prevent tampering.