

# Roadside Opacity Test Procedure for Heavy Diesel Vehicles

## 1.0 PURPOSE

- 1.1. This document provides the procedure to conduct roadside testing of heavy diesel vehicles to assess compliance with section 4 of O. Reg. XXX/XX.

## 2.0 LIMITATIONS

- 2.1. This procedure requires the use of
  - i. a device meets the specifications set out in the document entitled “Snap-Acceleration Smoke Test Procedure for Heavy-Duty Diesel Powered Vehicles”, also known as “SAE J 1667”, published by the Society of Automotive Engineers, dated February 1996, or
  - ii. a device that, in the opinion of the Director is equivalent to a device described in paragraph i.

These devices are often referred to as a sampling type smokemeter or a partial flow smokemeter.

- 2.2. Ambient Air Test Conditions:

- 2.2.1. No testing shall occur when visible humidity (for example fog, rain and snow) is present where exhaust samples are drawn or the smoke plume is measured.
- 2.2.2. No testing shall occur when the ambient air temperature at the test location is below 2° C (36° F) or above 30° C (86° F) unless correction factors to compensate for relative humidity, barometric pressure, or ambient temperature are applied.

## 3.0 SMOKEMETER CALIBRATION VERIFICATION

- 3.1. The smokemeter is calibrated in accordance with the manufacturer’s instructions.
- 3.2. Record the result.

## 4.0 PRE-TEST SAFETY CHECK AND VEHICLE PREPARATION

- 4.1. Ensure that the vehicle operator keeps the motor running. If the motor is inadvertently shut off, the motor should be immediately restarted and the operator should be instructed to move the vehicle as quickly as possible in the vehicle’s lowest gear for at least 25 feet, in order to activate the motor air/fuel ratio controls on some motors.
- 4.2. Confirm that the vehicle is diesel fuelled and has a manufacturer’s gross vehicle weight rating of greater than 4,500 kg (9,921 lbs).
- 4.3. Chock the vehicle wheels.
- 4.4. Visually inspect the vehicle exhaust system for any leaks; if a severe leak prevents the exhaust from exiting at the end of the stack, test at the point of leakage (unless this point is immediately downstream of a bend in the pipe). If testing is impractical, have the vehicle repaired and retested.
- 4.5. Verify that the operator has set the motor idle speed to low idle.

- 4.6. All accessories including the vehicle air conditioning must be turned off.
- 4.7. If the motor is equipped with a motor brake, it must be deactivated.
- 4.8. The parking brake and trailer brakes must be released and the vehicle brakes must not be applied.
- 4.9. Any device installed on the motor or vehicle that alters the normal acceleration characteristics of the motor and have the effect of temporarily lowering snap-acceleration results or preventing the test from being successfully completed shall be deactivated prior to testing.

## **5.0 TEST PROCEDURE**

With the vehicle conditioned as in 4.0:

- 5.1. Prior to conducting the opacity test on a vehicle equipped with multiple exhaust outlets, determine which exhaust outlet exhibits the highest smoke level by visually comparing the exhaust smoke from each outlet during one or more repetitions of the snap-acceleration test cycle. If there is no discernible difference in the exhaust smoke exiting each outlet, conduct the testing using the most convenient outlet. If there is a difference in the exhaust smoke from the multiple outlets, conduct the test using the exhaust outlet that visually appears to have the highest smoke level.
- 5.2. Initiate the smokemeter test sequence.
- 5.3. Enter required information into smokemeter as prompted. Instruct smokemeter that clean out snaps will be performed.
- 5.4. Prior to attaching or inserting the sensor head into the exhaust stack, have the smokemeter perform zero and full-scale checks when prompted.
- 5.5. Place sensor into the exhaust stack/tailpipe.
- 5.6. Per smokemeter prompts, have vehicle operator conduct at least three preliminary snap-acceleration test cycles using the sequence described in 6.0.
- 5.7. Within two minutes of the execution of the three preliminary snap-acceleration cycles per smokemeter prompts, conduct the three official snap-acceleration test cycles using the sequence described in 6.0.

## **6.0 VEHICLE OPERATOR INSTRUCTION - SNAP-ACCELERATION TEST CYCLE**

- 6.1. The vehicle operator shall move the accelerator to fully open as rapidly as possible.
- 6.2. The operator shall hold the accelerator in the fully open position for one to four seconds after the motor has achieved its maximum governed speed.
- 6.3. Upon completion of the one to four seconds at maximum governed speed, the operator shall release the accelerator and allow the motor to return to low idle speed.
- 6.4. Once the motor has reached its low idle speed, the operator shall allow the motor to remain idle for a minimum of 5 seconds, but no longer than 45 seconds, before initiating the next snap-acceleration test cycle.

## **7.0 TEST VALIDATION**

- 7.1. Upon completion of the three official snap-acceleration test cycles, remove the sensor head from the exhaust stack/tailpipe and, if prompted by the smokemeter, conduct the post-test zero procedure.
- 7.2. If the difference between the highest and lowest of the three official snap-acceleration test results is five opacity percentage points or less, then the test was valid.
  - 7.2.1. If the test was valid, print out a copy of the test results and save the data.
  - 7.2.2. If the test was invalid, repeat the test procedure. (If improper or inconsistent application of the accelerator is suspected, re-instruct the vehicle operator as to the proper execution of the snap-acceleration test cycle or refer to the smokemeters User Manual for troubleshooting invalid tests.)
- 7.3. Compare the average opacity of the three official snap-acceleration tests to the opacity standard for the vehicle set out in s.4 of O. Reg XXX/XX to determine compliance.