

**WAC 173-58-080 Close proximity exhaust system sound level measurement procedure.** This section establishes specific procedures for the measurement of sound levels from exhaust systems at a distance of 20 inches (0.5 meter) from the exhaust outlet. The procedures of subsections (3), (4) and (5) of this section shall not be used for exhaust systems which utilize the introduction of water to the exhaust gas flow for the purpose of muffling the exhaust noise levels, or systems which exhaust the gas flow directly into water.

(1) For the purposes of this section "vehicle" means any motor driven contrivance used as a means of transportation or recreation off of public highways.

(2) Initial inspection. An initial inspection of the vehicle exhaust system shall be conducted to determine if the following defects or modifications exist:

(a) The absence of a muffler;

(b) The presence of a muffler cut-out, bypass, or similar device which is not standard or normal equipment for the exhaust system being inspected;

(c) Defects in the exhaust system including, but not limited to, pinched outlets, and holes or rusted through areas of the muffler or pipes;

(d) The presence of equipment which will produce excessive or unusual noise from the exhaust system.

If the above defects are observed and are a violation of the muffler integrity standards established for the type of vehicle which is being inspected, then a citation shall be issued in accordance with the enforcement section of the applicable regulation.

An evaluation of the vehicle sound level shall also be made by the enforcement officer, using the human ear as a sensing device.

If the exhaust noise is discernibly louder than the engine noise, or if any of the defects or modifications described above exist but are not violations of applicable regulations, the enforcement officer shall request the vehicle operator to submit the vehicle to any measurement procedures described in this chapter which are applicable to the type of vehicle being inspected. If the operator refuses to submit the vehicle to these measurement procedures, he shall be in violation of this chapter.

(3) Test site and instrumentation set up. The test site and instrumentation shall be set up as follows:

(a) The test site shall be a flat, open area free of large, sound-reflecting surfaces (other than the surface on which the vehicle is resting), such as signboards, buildings, large docks, hillsides, or other vehicles, located within a 16-foot (5-meter) radius of the vehicle being tested and the location of the microphone. The vehicle shall not be on a hoist, rack, or over a pit. Testing shall not occur within a shop or building. Nobody shall stand in the measurement area, except the observer and the vehicle operator.

(b) The microphone shall be at the same height as the center of the exhaust outlet if possible, but no closer to any surface than 8 inches (0.2 meter). The microphone shall be positioned with its longitudinal axis parallel to the ground,  $20 \pm 1$  inches (0.5 meter) from the edge of the exhaust outlet, and  $45 \pm 10$  degrees from the axis of the outlet. For exhaust outlets located inboard from the vehicle body, the microphone shall be located at the above specified angle and at least 8 inches (0.2 meter) from the nearest part of the vehicle.

For vehicles provided with exhaust outlets spaced more than 12 inches (0.3 meter) apart, measurements shall be made for each outlet

as if it were the only one, and the highest level shall be recorded. If the exhaust outlets are less than twelve inches (0.3 meter) apart, a single measurement shall be made for any one of the outlets.

For vehicles with a vertical exhaust, the microphone shall be placed at a height of  $48 \pm 2$  inches (1.2 meter). Its axis shall be vertical and oriented upwards. It shall be placed at a distance of  $20 \pm 1$  inches (0.5 meter) from the side of the vehicle nearest the exhaust outlet.

For vehicles with the exhaust system outlet near the engine, the engine hood (if one exists) should be closed as much as possible to reduce engine noise.

If a measuring device is attached to the exhaust outlet and the microphone to maintain proper distance, insure that no vibrations from the vehicle shall be transmitted to the instrument.

(4) Vehicle operation. The vehicle shall be operated as follows:

(a) Controlled ignition vehicles. The engine shall be operated at a normal operating temperature with transmission in park or neutral. Sound level measurements shall be made at three-fourths (75 percent) of the RPM for rated horsepower  $\pm 100$  RPM of meter reading.

(b) Vehicles with motorcycle engines. The engine shall be operated at normal operating temperatures with the transmission in neutral. If no neutral is provided, the vehicle shall be operated either with the rear wheel or wheels 2-4 inches (5-10 centimeters) clear of the ground, or with the drive chain or belt removed. The sound level measurement shall be made with the engine speed stabilized at one of the following values:

(i) If the engine data is available, test the vehicle at one-half (50 percent) of the RPM for maximum rated horsepower  $\pm 100$  RPM.

(ii) If the engine data is not available, and if the vehicle has a tachometer showing the manufacturer's recommended maximum engine speed ("red line"), test the vehicle at 60 percent of the "red line" RPM  $\pm 100$  RPM.

(iii) If the engine data and red line RPM are not available, test the vehicle at:

(A)  $3500 \pm 100$  RPM for engines with total cylinder displacement between 0-950 cc (0-58 in.<sup>3</sup>).

(B)  $2800 \text{ RPM} \pm 100 \text{ RPM}$  for engines with total cylinder displacement greater than 950 cc (58 in.<sup>3</sup>).

(c) Diesel engine vehicles. The engine shall be operated at normal operating temperatures with transmission in park or neutral. Sound level measurements shall be made at the vehicle's maximum governed no-load speed. If the engine is not provided with a governor, the vehicle shall be operated in the same manner as a vehicle with a controlled ignition.

(5) Measurement. The exhaust system sound level shall be measured as follows:

(a) The sound level meter shall be set for slow response and on the "A" weighting scale.

(b) The sound level meter shall be observed during the full cycle of engine acceleration-deceleration. The recorded sound level shall be the highest value obtained at the appropriate, constant engine speed as specified in subsection (4) of this section, and shall exclude peaks due to unrelated ambient noise, engine noise, or extraneous impulsive-type noise.

(c) At least two measurements shall be made, and the reported sound level shall be the average of the two highest readings which are within one dBA of each other.

[Statutory Authority: Chapter 70.107 RCW. WSR 79-04-033 (Order DE 78-19), § 173-58-080, filed 3/22/79.]