

$$R = \frac{C_i - C_o}{C_i} \times 100 \quad (\text{Eq. 2})$$

Where:

R = percent reduction in CO or THC

$C_i$  = corrected CO or THC concentration at inlet of the emission control device

$C_o$  = corrected CO or THC concentration at the outlet of the emission control device.

**§ 63.9321 What are the general requirements for performance tests?**

(a) You must conduct each performance test required by § 63.9310 according to the requirements in § 63.7(e)(1) and under the conditions in this section unless you obtain a waiver of the performance test according to the provisions in § 63.7(h).

(1) *Representative engine testing conditions.* You must conduct the performance test under representative operating conditions for the test cell/stand. Operations during periods of SSM, and during periods of nonoperation do not constitute representative conditions. You must record the process information that is necessary to document operating conditions during the test and explain why the conditions represent normal operation.

(2) *Representative emission capture system and add-on control device operating conditions.* You must conduct the performance test when the emission capture system and add-on control device are operating at a representative flow rate, and the add-on control device is operating at a representative inlet concentration. You must record information that is necessary to document emission capture system and add-on control device operating conditions during the test and explain why the conditions represent normal operation.

(b) You must conduct each performance test of an emission capture system according to the requirements in § 63.9322. You must conduct each performance test of an add-on control device according to the requirements in § 63.9323.

**§ 63.9322 How do I determine the emission capture system efficiency?**

You must use the procedures and test methods in this section to determine capture efficiency as part of the performance test required by § 63.9310.

(a) *Assuming 100 percent capture efficiency.* You may assume the capture system efficiency is 100 percent if both conditions in paragraphs (a)(1) and (2) of this section are met:

(1) The capture system meets the criteria in Method 204 of appendix M to 40 CFR part 51 for a potential to emit (PTE) and directs all the exhaust gases from the enclosure to an add-on control device.

(2) All engine test operations creating exhaust gases for which the test is applicable are conducted within the capture system.

(b) *Measuring capture efficiency.* If the capture system does not meet the criteria in paragraphs (a)(1) and (2) of this section, then you must use one of the two protocols described in paragraphs (c) and (d) of this section to measure capture efficiency. The capture efficiency measurements use total volatile hydrocarbon (TVH) capture efficiency as a surrogate for organic HAP capture efficiency. For the protocol in paragraph (c) of this section, the capture efficiency measurement must consist of three test runs. Each test run must be at least 3 hours in duration or the length of a production run, whichever is longer, up to 8 hours. For the purposes of this test, a production run means the time required for a single engine test to go from the beginning to the end.

(c) *Gas-to-gas protocol using a temporary total enclosure or a building enclosure.* The gas-to-gas protocol compares the mass of TVH emissions captured by the emission capture system to the mass of TVH emissions not captured. Use a temporary total enclosure or a building enclosure and the procedures in paragraphs (c)(1) through (5) of this section to measure emission capture system efficiency using the gas-to-gas protocol.

(1) Either use a building enclosure or construct an enclosure around the engine test cell/stand and all areas where emissions from the engine testing subsequently occur. The enclosure must meet the applicable definition of a temporary total enclosure or building enclosure in Method 204 of appendix M to 40 CFR part 51.

(2) Use Method 204B or 204C of appendix M to 40 CFR part 51 to measure the

total mass, kg, of TVH emissions captured by the emission capture system during each capture efficiency test run as measured at the inlet to the add-on control device. To make the measurement, substitute TVH for each occurrence of the term VOC in the methods.

(i) The sampling points for the Method 204B or 204C of appendix M to 40 CFR part 51 measurement must be upstream from the add-on control device and must represent total emissions routed from the capture system and entering the add-on control device.

(ii) If multiple emission streams from the capture system enter the add-on control device without a single common duct, then the emissions entering the add-on control device must be simultaneously measured in each duct, and the total emissions entering the add-on control device must be determined.

(3) Use Method 204D or 204E of appendix M to 40 CFR part 51 to measure the total mass, kg, of TVH emissions that

are not captured by the emission capture system; they are measured as they exit the temporary total enclosure or building enclosure during each capture efficiency test run. To make the measurement, substitute TVH for each occurrence of the term VOC in the methods.

(i) Use Method 204D of appendix M to 40 CFR part 51 if the enclosure is a temporary total enclosure.

(ii) Use Method 204E of appendix M to 40 CFR part 51 if the enclosure is a building enclosure. During the capture efficiency measurement, all organic compound emitting operations inside the building enclosure, other than the engine test cell/stand operation for which capture efficiency is being determined, must be shut down, but all fans and blowers must be operating normally.

(4) For each capture efficiency test run, determine the percent capture efficiency of the emission capture system using Equation 1 of this section:

$$CE = \frac{TVH_{\text{captured}}}{(TVH_{\text{captured}} + TVH_{\text{uncaptured}})} \times 100 \quad (\text{Eq. 1})$$

Where:

CE = capture efficiency of the emission capture system vented to the add-on control device, percent

TVH<sub>captured</sub> = total mass of TVH captured by the emission capture system as measured at the inlet to the add-on control device during the emission capture efficiency test run, kg, determined according to paragraph (c)(2) of this section

TVH<sub>uncaptured</sub> = total mass of TVH that is not captured by the emission capture system and that exits from the temporary total enclosure or building enclosure during the capture efficiency test run, kg, determined according to paragraph (c)(3) of this section.

(5) Determine the capture efficiency of the emission capture system as the average of the capture efficiencies measured in the three test runs.

(d) *Alternative capture efficiency protocol.* As an alternative to the procedure specified in paragraph (c) of this section, you may determine capture efficiency using any other capture effi-

ciency protocol and test methods that satisfy the criteria of either the data quality objective or lower control limit approach as described in appendix A to subpart KK of this part.

**§ 63.9323 How do I determine the add-on control device emission destruction or removal efficiency?**

You must use the procedures and test methods in this section to determine the add-on control device emission destruction or removal efficiency as part of the performance test required by § 63.9310. You must conduct three test runs as specified in § 63.7(e)(3), and each test run must last at least 1 hour.

(a) For all types of add-on control devices, use the test methods specified in paragraphs (a)(1) through (5) of this section.

(1) Use Method 1 or 1A of appendix A to 40 CFR part 60, as appropriate, to select sampling sites and velocity traverse points.