

BUREAU OF AIR QUALITY CONTROL

CHAPTER 126: CAPTURE EFFICIENCY TEST PROCEDURES

SUMMARY: This regulation specifies the test procedures required to measure how much of the total volatile organic compound (VOC) emissions from the regulated source is captured and delivered to the device that destroys the VOC.

1. Definitions.

For purposes of this regulation, the following definitions and abbreviations apply:

A. Capture. "Capture" means the containment or recovery of emissions from a process for direction into a duct which may be exhausted through a stack or sent to a control device.

B. Capture system. "Capture system" means all equipment (including, but not limited to, hoods, ducts, fans, booths, ovens, driers, etc.) used to contain, capture, or transport an air pollutant to a control device.

C. Capture efficiency. "Capture efficiency" means the weight per unit time of VOC entering a capture system and delivered to a control device divided by the weight per unit time of total VOC generated by a source of VOC, expressed as a percentage.

D. Control device. "Control device" means equipment (such as an incinerator or carbon adsorber) used to reduce, by destruction or removal, the amount of air pollutant(s) in an air stream prior to discharge to the ambient air.

E. Control system. "Control system" means a combination of one or more capture systems(s) and control devices working in concert to reduce discharges of pollutants to the ambient air.

F. Destruction or removal efficiency. "Destruction or removal efficiency" means the efficiency, expressed as a decimal fraction, of a control device in destroying or removing contaminants calculated as one minus the ratio of the amount of VOC exiting the control device to the amount of VOC entering the control device.

G. Gas/gas method. "Gas/gas method" means either of two methods for determining capture which rely only on gas phase measurements. One method requires construction

of a temporary total enclosure (TTE) to assure all fugitive emissions are measured while the other method uses the room or building which houses the emission source as an enclosure.

H. Hood. "Hood" means a partial enclosure or canopy for capturing and exhausting, by means of a draft, the organic vapors or other fumes rising from a coating process or other source.

I. Liquid/gas method. "Liquid/gas method" means either of two methods for determining capture which require both gas phase and liquid phase measurements and analysis. One liquid/gas method requires construction of a temporary enclosure, the other uses the building or room which houses the facility as an enclosure.

J. Overall emission reduction efficiency. "Overall emission reduction efficiency" means the weight per unit time of VOC removed by a control device divided by the weight per unit time of VOC emitted by an emission source expressed as a percentage. The overall emission reduction efficiency is the product of the capture efficiency and the control equipment destruction or removal efficiency.

K. PTE. "PTE" means a permanent total enclosure, which contains a process that emits VOC and meets the specifications given in Procedure T.

L. TTE. "TTE" means a temporary total enclosure which is built around a process that emits VOC and meets the specifications given in Procedure T.

M. BE. "BE" means a building or room enclosure that contains a process that emits VOC. If a BE is to serve as a PTE or TTE, the appropriate requirements given in Procedure T must be met.

2. Procedures.

The testing procedures and specifications described in this Chapter as "Procedure F.1", "Procedure F.2", "Procedure G.1", "Procedure G.2", "Procedure L", and "Procedure T" are attached to this rule as Appendix A and are incorporated herein by reference.

3. Applicability

A. The requirements of Section 4 shall apply to all regulated VOC emitting processes that employ add-on control devices subject to Chapter 123, Paper Coating or graphic arts regulation except as provided below.

B. If a source installs a PTE that meets the specifications in Procedure T, and which directs all VOC to a control device, the capture efficiency is assumed to be 100 percent, and the source is exempted from the requirements described in Section 4. This exemption does not exempt a source from performance of any control device efficiency testing required under these or any other regulations. In addition, a source must demonstrate all criteria for a PTE are met during the testing for control efficiency.

C. If a source uses a control device designed to collect and recover VOC (e.g. carbon adsorber), an explicit measurement of capture efficiency is not necessary if the conditions given below are met. The overall control of the system can be determined over a 24-hour period by directly comparing the input liquid VOC (L) to the recovered liquid VOC. The general procedure for use of such a control device is described in 40 CFR 60.433 with the following additional restrictions:

1. The source must be able to initially equate solvent usage with solvent recovery on a 24-hour (daily) basis, rather than a 30-day weighted average as described in 40 CFR 60.433. Thereafter, the source must equate solvent usage with solvent recovery over another time period as deemed acceptable by the Department not to exceed 30 days. This demonstration must be done within 72 hours of the required time period over which the demonstration is to be done. Any recovery rates as calculated with the above procedure less than that needed to comply with the applicable regulation shall be reported to the Department within 7 days.

2. The solvent recovery system (i.e., capture and control system) must be dedicated to a single process line (e.g., one process line venting to a carbon absorber system), or

3. If the solvent recovery system controls multiple process lines, the source must be able to demonstrate that the overall control (i.e., the total recovered solvent VOC divided by the sum of liquid VOC input to all process lines venting to the control system) meets or exceeds the most stringent standard applicable for any process line venting to the control system.

4. Specific Requirements

A. The capture efficiency of a process line shall be measured using one of the four protocols given in Section 4(C).

During any capture efficiency test, the average face velocity of each emissions collection point ducted to the control device shall be measured and recorded. In addition, the distance between each collection point ducted to the control device and the emission source shall be measured and recorded. Measurements of average face velocity shall be done by determining average volumetric flow rate using Reference Method 2, 2A or 2C

of 40 CFR Part 60, Appendix A and dividing by the total area of the face of the collection point.

B. Any error margin associated with a test protocol may not be incorporated into the results of a capture efficiency test.

C. Any affected source must use one of the following four capture protocols to measure capture efficiency:

1. Gas/gas method using TTE. The EPA specifications to determine whether a temporary enclosure is considered a TTE are described in Procedure T. The capture efficiency equation to be used for this protocol is:

$$CE = Gw / (Gw + Fw)$$

where: CE = capture efficiency, decimal fraction

Gw = mass of VOC captured and delivered to control device using a TTE.

Fw = mass of fugitive VOC that escapes from a TTE

Procedure F.1 is used to obtain Fw. Procedure G.2 is used to obtain Gw. In this case, a single flame ionization analyzer (FIA) at the same span setting can often be used simultaneously for both Procedure F.1 and G.2. If such use of a single FIA is not feasible, for example due to concentration differences, Procedure G.1 may be used for determination of GW with the approval of the Department.

2. Liquid/gas method using TTE. The EPA specifications to determine whether a temporary enclosure is considered a TTE are given in Procedure T. The capture efficiency equation to be used for this protocol is:

$$CE = (L - F) / L$$

where: CE = capture efficiency, decimal fraction

L = mass of liquid VOC input to process

F = mass of fugitive VOC that escapes from a TTE

Procedure L is used to obtain L. Procedure F.1 is used to obtain F.

3. Gas/gas method using the building or room (BE) in which the affected source is located as the enclosure and in which both the mass of VOC captured and delivered to the control device and the mass of fugitive VOC that escapes the BE are measured while operating only the affected facility. All fans and blowers in the building or room must be operated as they would under normal production. The capture efficiency equation to be used for this protocol is:

$$CE = G/(G + F_B)$$

where: CE = capture efficiency, decimal fraction

G = mass of VOC captured and delivered to a control device

F_B = mass of fugitive VOC that escapes from building enclosure.

Procedure F.2 is used to obtain F_B. Procedure G.2 is used to obtain G. In this case, a single flame ionization analyzer (FIA) at the same span setting can often be used simultaneously for both Procedure F.2 and G.2. If such use of a single FIA is not feasible, for example due to concentration differences, Procedure G.1 may be used for determination of G with the approval of the Department.

4. Liquid/gas method using the building or room (BE) in which the affected source is located as the enclosure and in which the mass of liquid VOC input to process and the mass of fugitive VOC that escapes from a building enclosure are measured while operating only the affected facility. All fans and blowers in the building or room must be operated as they would under normal production. The capture efficiency equation to be used for this protocol is:

$$CE = (L-F_B)/L$$

where: CE = capture efficiency, decimal fraction

L = mass of liquid VOC input to process

F_B = mass of fugitive VOC that escapes from building enclosure

Procedure L is used to obtain L. Procedure F.2 is used to obtain F_B.

5. Recordkeeping and Reporting

A. All affected facilities must maintain a copy of the capture efficiency protocol on file. All results of appropriate test methods and capture efficiency protocols must be reported to the Department within sixty (60) days of the test date. A copy of the results must be maintained on site and must be made available to the Department upon written or oral request.

B. If any changes are made to capture or control equipment, the source is required to notify the Department of these changes and a new test may be required.

A change to the capture or control equipment shall be defined as any modification to or malfunction of the capture system or control system that increases the distance between any emissions collection point and the emissions source that the collection point is serving or that reduces the average face velocity at any emissions collection point ducted to the control device to a value less than 90% of the value measured and recorded during the capture efficiency test. Reduction in the air flow at a collection point that occur because the emission source that the collection point is serving is not being utilized shall not be considered a change requiring Department notification. Measurements of average face velocity shall be done at all collection points whenever any physical changes are made to the capture system.

C. The source must notify the Department 30 days prior to performing any capture efficiency and/or control efficiency tests.

D. A source utilizing a PTE must demonstrate that this enclosure meets the requirement given in procedure T for a PTE during any testing of the control device.

E. A source utilizing a TTE must demonstrate that its TTE meets the requirements given in Procedure T for a TTE during testing of their control device. The source must also provide documentation that the quality assurance criteria for a TTE have been achieved.

BASIS STATEMENT : This regulation was needed in order to improve the Department's and EPA's ability to enforce the State Implementation Plan volatile organic compound regulations concerning paper coating (Chapter 123) and future graphic art regulations. States are required to adopt enforceable capture efficiency requirements now that capture efficiency testing protocols are available from EPA.

Comments were received from the U.S. Environmental Protection Agency to ensure consistency with EPA's model regulation. The Department agreed with the suggested changes which include clarifying the applicability of the regulation, listing the operating parameters which must be measured by the source to ensure that capture efficiency does not change in the future, and requiring the source to notify the Department when there is a change to the capture or control system. A number of other minor changes were made for clarification.

Another commentor suggested that the requirement to equate solvent usage with solvent recovery on a 24-hour (daily) basis instead of a 30-day (monthly) basis would result in erratic efficiencies. To address this concern, the Department required the source to only initially equate solvent usage with solvent recovery on a 24-hour basis. Thereafter, the source must equate solvent usage with solvent recovery over another time period as deemed acceptable by the Department not to exceed 30 days.

AUTHORITY: 38 MRSA Section 343-A and 585-A

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