



# Massachusetts Department of Environmental Protection

Bureau of Air and Waste - Air Quality

## BAW AQ Adsorption Equipment

Submit with Form CPA-PROCESS whenever construction, substantial reconstruction or alteration of Adsorption Equipment is proposed unless exempt per 310 CMR 7.02(2)(b).

Facility ID (if known) \_\_\_\_\_

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



### A. Inlet Operating Conditions

1. Complete the tables below with information on inlet gas flow(s).

Table 1a					
Emission Unit No(s). Being Controlled	Average Inlet Gas Flow (Actual Cubic Feet Per Minute)	Moisture Content in the Inlet (Pounds Per Minute)	Inlet Temperature (Degrees Fahrenheit (°F))	Is the Gas Stream Pre-Cleaned? <sup>1</sup>	If Pre-Cleaned, Explain
				<input type="checkbox"/> Yes <input type="checkbox"/> No	
				<input type="checkbox"/> Yes <input type="checkbox"/> No	
				<input type="checkbox"/> Yes <input type="checkbox"/> No	
				<input type="checkbox"/> Yes <input type="checkbox"/> No	

<sup>1</sup> You may be required to submit an additional supplemental form if you operate pre-cleaner equipment. Contact the MassDEP regional office for guidance.

Table 1b			
Emission Unit No(s). Being Controlled	Air Contaminant	Air Contaminant Range Before Control (Pounds Per Hour)	Air Contaminant Range Before Control (Parts Per Million by Volume, Dry Basis)
Total Before Control:			

2. Provide the capture efficiency of the ventilation system serving the Adsorption Equipment. The presumption is that the capture efficiency of the system meets the criteria of the Permanent Total Enclosure (PTE) detailed in EPA Method 204.

Weight Percent (%) \_\_\_\_\_

3. If the proposed system does not meet the PTE criteria, explain:

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#### B. Specifications

1. Manufacturer of Adsorption Equipment:

Company \_\_\_\_\_

2. Model Number (or Equivalent):

Number \_\_\_\_\_

3. Adsorbent Material

Description \_\_\_\_\_

a. Mesh Size:

Size \_\_\_\_\_

b. Void Fraction:

Fraction \_\_\_\_\_

c. Bulk Density:

Pounds Per Cubic Feet \_\_\_\_\_

4. Amount of Adsorbent Used Per Bed:

Pounds \_\_\_\_\_

5. Number of Vessels:

Number \_\_\_\_\_

6. Number of Beds Per Vessel:

Number \_\_\_\_\_

7. Face Area Per Vessel:

Square Feet \_\_\_\_\_

8. Height of Bed:

Feet \_\_\_\_\_

9. Bed Volume:

Cubic Feet \_\_\_\_\_

10. Outlet Temperature of Unit:

Degrees Fahrenheit (°F) \_\_\_\_\_

11. Pressure Drop Across Unit:

Inches of Water \_\_\_\_\_

12a. Is the system designed to be pressurized for increased efficiency?

☐ Yes ☐ No

12b. If Yes, what is the system pressure?

Pounds Per Square Inch \_\_\_\_\_

#### C. Description of Adsorption Equipment

1a. What is the system's break point/saturation time? \_\_\_\_\_

1b. Describe in detail how the system's break point/saturation time was determined:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



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#### C. Description of Adsorption Equipment (continued)

2. Describe in detail the system's cleaning procedure and schedule:

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3. Type of System:

☐ Regenerative – Complete 4a. through 4d.

☐ Non-Regenerative – Skip to D. Emissions Data

4a. Describe how the saturated adsorbent will be stripped:

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4b. Time required to adequately strip adsorbent:

Minutes \_\_\_\_\_

4c. If stripping by steam:

Number of Pounds Per Hour \_\_\_\_\_

Pressure in Pounds Per Square Inch Gauge \_\_\_\_\_

Temperature in Degrees Fahrenheit (°F) \_\_\_\_\_

4d. Describe how the bed will be adequately cooled and dried prior to reuse:

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#### D. Emissions Data

1. Describe air contaminant emissions after control by the proposed Adsorption Equipment.

Table 2			
Air Contaminant	Air Contaminant Removal Efficiency (Weight Percent)	Air Contaminant Emission Rate After Control (Pounds Per Hour)	Air Contaminant Emission Rate After Control (Parts Per Million by Volume, Dry Basis)



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#### D. Emissions Data (continued)

2. Explain how the above air contaminant emissions data were obtained. Attach appropriate calculations and documentation.

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#### E. Drawing of Adsorption Equipment Control System

You must attach to this form a schematic drawing of the proposed Adsorption Equipment and any pre-cleaner. The downstream design should be indicated on the drawing. At a minimum, the stack, sampling ports for emissions testing, and location of each pressure and temperature indicator must be shown.

#### F. Monitoring, Record Keeping & Failure Notification

1. Describe the parameters that will be monitored as a surrogate for control device efficiency, and the frequency of monitoring. Continue on a separate attachment, if necessary.

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2. Describe the monitoring methods and warning/alarm system that protect against operation when the unit is not meeting design efficiency (e.g. visual monitoring, audible alarm, flashing lights, temperature indicator, pressure indicator). Continue on a separate attachment, if necessary.

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3. Describe the record keeping procedures to be used to verify monitoring and to identify the cause, duration and resolution of each failure. Continue on a separate attachment, if necessary.

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4. Describe how failure of the Adsorption Equipment will be made known to the operator during normal operations (e.g. visual monitoring, audible alarm, flashing lights, time indicator, pressure indicator). Continue on a separate attachment, if necessary.

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#### F. Monitoring, Record Keeping & Failure Notification (continued)

5. List and explain all operating and safety controls associated with this system, including interlock systems that prevent introduction of the air contaminant(s) stream until the Adsorption Equipment is operating properly. Continue on a separate attachment, if necessary.

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6. Describe the Adsorption Equipment's emergency procedures during system upsets. Continue on a separate attachment, if necessary.

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7. Describe features of the system design and operation that will allow for emissions testing using MassDEP-sanctioned test methods. Continue on a separate attachment, if necessary.

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#### G. Standard Operating & Maintenance Procedures

Attach to this form the standard operating and maintenance procedures for the proposed Adsorption Equipment, as well as a list of the spare parts inventory that you will maintain on site, as recommended by the equipment vendor(s).

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