

## Instructions

### FORM F1104

#### Actual Volatile Organic Compound Emissions Using Material Balance

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Form F1104 is part of the form series provided to Title V Operating Permit holders to report annual emissions of regulated air pollutants subject to fees to the Department of Environmental Quality. The fee report process and the regulated air pollutants subject to fees are described in the general instructions for the F1100 form series. The instructions below are for form F1104.

The source owner or operator must complete form F1104 if he or she has chosen to pay for emissions of volatile organic compounds (VOC) for any device or process based on actual emissions using material balance. To determine VOC emissions using material balance, the owner or operator must:

- Have records of quantities used of the paints, coatings, inks and solvents being reported;
- Have records of quantities of VOC waste and an analysis of solvent content where applicable, such as the hazardous waste characterizations.
- Determine emissions of VOCs through material balance per OAR 340-220-0150; and
- Use the following material balance methods:
  - EPA Method 18, 24, or 25 (per 40 CFR Part 60) to determine the amount of VOC added to the process, the amount of VOC consumed in the process, and the amount of VOC recovered in the process; or
  - A facility-specific method specified in the permit.

Complete as many forms as needed to report all emission sources. Report the emissions determined on form F1104 on form F1102.

Form F1104 provides for the owner or operator to deduct quantities of VOC waste and VOC consumed by or recovered from the device or process. It provides for the owner or operator to determine VOC emissions from controlled and uncontrolled devices and processes. For devices and processes with a control device, the owner or operator will determine any VOC emissions that are emitted before emissions are sent through the control device.

#### Form instructions

1. Enter the reporting year.
2. Enter the facility name. Include a site identifier if the corporation has multiple facilities by the same name in Oregon.
3. Enter the permit number.
4. Complete the following sections for each emission source (device or process).
  - a. Enter the device or process ID. Add a short description of the device or process unless the ID contains one (e.g. "Paint Booth #1" shows that the device is a paint booth and doesn't need additional description). For each VOC-containing liquid, provide the information requested (in the sections below) in a column of the form.
  - b. Enter the name of the paint, coating, ink or solvent.
  - c. Enter the quantity of the paint, coating, ink or solvent (in gallons) used during the reporting year.
  - d. Enter the density of the paint, coating, ink or solvent (in pounds per gallon).
  - e. VOC content: Enter the proportion (by weight) of VOC (e.g. enter one and a half percent as 0.0150). Exclude the proportion of exempt VOC. Exempt VOCs are described in OAR 340-200-0020(143).
  - f. VOC recovered and consumed: Complete this section if the emission source has a control device. This section provides for the owner or operator to determine the quantity of VOC that is consumed by or recovered from the emission source before emissions are sent through the control device. This quantity will be deducted in the emissions calculation (in section 4h). VOC that is recovered from

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the process is assumed to be recycled and sent out of the plant. VOC recovered and reintroduced into the process (reused internally) is not included in this calculation. VOC recovered and consumed in the following two scenarios is addressed later (in section 4k): The emission source does not have a VOC control device; or VOC is consumed by or recovered from the emission source after emissions are sent through the control device.

- Enter “zero” in 4f if:
    - The emission source does not have a control device; or
    - The owner or operator chooses not to calculate and deduct the quantity of VOCs that are consumed by or recovered from the emission source before emissions are sent through the control device (e.g. the quantity is negligible); or
  - Enter the total quantity of the paint, coating, ink or solvent (in gallons) consumed by and recovered from the emission source before emissions are sent through the control device. Attach supporting data and calculations.
- g. VOC waste: Complete this section if the emission source has a control device. This section provides for the owner or operator to determine the quantity of VOC waste generated through use of the paint, coating, ink or solvent before emissions are sent through the control device. This quantity will be deducted in the emissions calculation (in section 4h). VOC waste generated in the following two scenarios is addressed later (in section 4l): The emission source does not have a control device; or VOC waste is generated after emissions are sent through the control device.
- Enter “zero” in 4g if:
    - The emission source does not have a control device; or
    - The owner or operator chooses not to calculate and deduct VOC waste generated before emissions are sent through the control device (e.g. the quantity is negligible); or
  - Enter the quantity of VOC waste (in pounds) for the types of waste produced. Multiply waste quantity, waste density and the waste’s VOC content. Attach supporting data and calculations.
 
$$4g = \text{waste quantity} \times \text{waste density} \times \text{waste VOC content}$$
- h. Quantity of VOC emissions: Complete this section to determine the quantity of VOC (in pounds) that would be emitted on an uncontrolled basis during the reporting year. If section 4f was completed (the quantity of the paint, coating, ink or solvent consumed by or recovered from the emission source before controls), subtract 4f from the total quantity used during the reporting year (4c). Multiply this by density (4d) and VOC content (4e). Subtract the quantity of VOC waste (4g).
- $$4h = [(4c - 4f) \times 4d \times 4e] - 4g$$
- i. Efficiency of control device:
- Enter “n/a” if a control device wasn’t used; or
  - If a control device was used, enter its efficiency. Control device efficiency is the proportion of VOC (by weight) that is removed by the control device (e.g. if five percent of VOC is removed, enter 0.050). Attach supporting documentation that describes the emission source; the control device type; the control device ID number; and the calculations used to determine the control device efficiency.
- j. Quantity of VOC emissions:
- If a control device wasn’t used, enter the quantity of uncontrolled emissions (from section 4h).
  - If a control device was used, determine the quantity of VOC emissions (in pounds) that would

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be emitted by the emission source on a controlled basis during the reporting year. Subtract control device efficiency (4i) from 1. Multiply this by the quantity of uncontrolled emissions (4h). Use this equation to calculate emissions:  $4j = 4h \times (1 - 4i)$

- If a control device was used, but VOC emissions escaped uncontrolled (e.g. fugitive emissions) prior to controls, report the sum of controlled and uncontrolled emissions in 4j and attach an explanation of how the uncontrolled emissions were calculated. Use the following equation to calculate the emissions when both controlled and uncontrolled emissions are emitted:

$$4j = [(4h * \text{capture efficiency}) \times (1 - 4i)] + 4h (1 - \text{capture efficiency})$$

Where: capture efficiency =  $\frac{\text{uncontrolled emissions sent to control device}}{\text{total uncontrolled emissions (4h)}}$

- k. VOC recovered and consumed: Complete this section whether or not the emission source has a control device. Determine the quantity of VOC (in pounds) consumed by or recovered from the emission source (e.g. spent solvents) for the following scenarios: The emission source does not have a control device; or VOC is consumed by or recovered from the emission source after emissions are sent through a control device. This quantity will be deducted in the emissions calculation (in section 4m).

- Enter “zero” if choosing not to calculate and deduct VOC consumed by or recovered from the emission source after the control device reduces VOC (e.g. the quantity is negligible); or
- Determine the quantity of VOC (in pounds) consumed by and recovered from the emission source after emissions are sent through a control device. Multiply the total quantity of the paint, coating, ink or solvent consumed and recovered, its density and its VOC content. At this point, the density and VOC content of the paint, coating, ink solvent differ from its original values in 4d and 4e. Attach supporting data and calculations.

$$4k = \text{quantity} \times \text{density} \times \text{VOC content}$$

- l. VOC waste: Complete this section whether or not the emission source has a control device. Determine the quantity of VOC waste (in pounds) generated through use of the paint, coating, ink or solvent in the following two scenarios: the emission source does not have a control device; or VOC waste is generated through use of the paint, coating, ink or solvent after emissions are sent through a control device. This quantity will be deducted in the emissions calculation (in section 4m).

- Enter “zero” if choosing not to calculate and deduct VOC waste that is generated after emissions are sent to the control device (e.g. the quantity is negligible); or
- Enter the quantity of VOC waste (in pounds). VOC waste is the product of waste quantity, waste density and the waste’s VOC content. Attach supporting data and calculations.

$$4l = \text{waste quantity} \times \text{waste density} \times \text{waste VOC content}$$

- m. Actual VOC emissions: Determine the actual quantity of VOC emissions in pounds. This is the quantity of emissions (4j) minus the VOC consumed by or recovered from the emission source (4k); minus the VOC waste (4l).

$$4m = 4j - 4k - 4l$$

- n. Actual VOC emissions: Convert the quantity of VOC emissions to tons (divide pounds by 2,000).

$$4n = 4m / 2,000$$



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5. Enter page numbers for the form and the total number of F1104 forms being submitted to DEQ.