



# South Coast Air Quality Management District

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## **Guidelines for Calculating Emissions from Paint and Ink Manufacturing Operations (June 2000)**

Beginning with the 1999-2000 Annual Emissions Reporting (AER) cycle, the following guidelines and methods can be used to calculate annual emissions from paint and ink manufacturing operations. Facilities may select any one of these methods for calculating emissions from these operations subject to the approval of the District.

Emissions calculation methodologies for these operations are described in detail in the Emission Inventory Improvement Program (EIIP) Guidelines, Volume II "Preferred and Alternative Methods for Estimating Air Emissions from Paint and Ink Manufacturing Facilities", Chapter 8, published in March 1998 by the Point Sources Committee of the EIIP. The EIIP document identifies several emissions estimating methods and provides examples of how emissions are estimated for paint and ink manufacturing operations. These methods are briefly mentioned here in these guidelines. However, to ensure that these methods are properly used for the purpose of calculating the annual emissions from batch-based paint and ink manufacturing operations, additional guidelines and requirements are also specified here which must be followed.

### ***Method 1: Theoretical Models/Equations***

This method calculates emissions by applying site-specific conditions to theoretical models/equations primarily derived from the Ideal Gas Law. In order to use this estimating method for calculating annual emissions, operator must obtain specific data for all input parameters required by the theoretical models/equations for all different types of products manufactured. These include:

1. operating data (i.e., ambient temperature, temperature profile for the mixture during mixing of raw products, exhaust flow rate, amount of each raw material processed, operating time and duration, ventilation time),
2. chemical/physical properties of the materials involved (i.e., density, VOC content, vapor pressure, vapor molecular weight),
3. physical characteristics/properties of the sources (i.e., batch sizes, tank sizes).

#### **Additional AQMD Guidelines and Requirements:**

- a) Because of the large number of batches and products manufactured per year, products with similar characteristics can be **grouped together into major product categories** if they meet the two criteria of having the **same batch size and solid content (within  $\pm 10\%$ )**. The operator must provide a complete list of all product types manufactured along with the number of batches manufactured per year, batch sizes, VOC contents and solid contents.

*Cleaning the air that we breathe...*

- b) For each major product category, input parameters must be obtained from a **representative number of batches** within each product category. The average of these values can then be used for calculating the annual emissions using the appropriate models.
- c) The **number of representative batches** for each major product category for which data (input parameters) should be collected would depend on the total number of batches within each major product category according to the following schedule:

<u># of Batches Manufactured per year per Major Product Category</u>	<u># of Representative Batches Selected for Collecting Input Parameters</u>
1 - 10	1
11 - 20	2*
21 - 30	3*
30 +	4*

\*Batches of different products within each major product category must be selected for collection of input parameters.

- d) The required input parameters should (i.e., operating data) be collected on a quarterly basis (once per quarter) for the representative batches of products within each major product category to account for seasonal and operational variations.
- e) Collection of input parameters should be in accordance with AQMD Protocols (e.g., measurements of parameters such as temperature profile and flow rate).
- f) The annual emissions must account for all operating stages of the manufacturing process and sources of emissions. These include, but are not limited to, material loading, heat-up losses (during mixing), surface evaporation, filling losses, solvent reclamation, cleaning, wastewater treatment, material storage, equipment leaks, and spills.
- g) The operator must provide the records of the total volume of solvents and VOC-containing raw materials used in manufacturing as well as the records of the total volume and VOC contents of products manufactured by each product type to validate the facility's overall annual emissions.
- h) The operator must provide all the data and calculations as supporting documentation in the final AER for AQMD approval.

**NOTE: Application of Method 1 is contingent upon the availability of actual input parameters collected during the reporting cycle.**

## ***Method 2 Material Balance***

The operator can choose to calculate emissions using the material balance method. This method requires the beginning and ending inventories of the VOCs from all raw materials at the plant and then subtracting out all of the known losses or transfers of the VOC material off-site including finished product and waste material. The inventories and losses or transfers of VOCs must be for the same time period, typically July 1 to June 30 for the year of inventory and AER report.

### **Additional AQMD Guidelines and Requirements:**

Records of production, beginning and ending inventories of VOC-containing materials, losses or transfers, and emissions calculations must be included with the final AER.

## ***Method 3 Source Test Data***

Test data is very source specific and uncommon for paint and ink manufacturing facilities. However, facilities may choose to use source test data for a particular stage of the manufacturing operation (e.g., mixing). Other methods must then be used to account for other sources of emissions in the manufacturing process.

### **Additional AQMD Guidelines and Requirements:**

- a) Test protocols should be approved by AQMD before initiating source testing.
- b) Source test data and emission calculation for all operations must be included in the final AER.

## ***Method 4: AP-42 Emission Factors***

Emission factors are commonly used to calculate emissions from paint and ink manufacturing facilities. EPA maintains a compilation of approved emission factors in the AP-42. These are essentially the loss factors that represent the overall emission rates based on the production rate or the amount of solvent used. The following factors can be used to calculate total VOC emissions:

- 0.034 lb VOC emitted / lb solvent used (newly proposed by EPA) or
- 21 lbs VOC emitted / ton coating produced ( $0.7 \times 30 = 21$ ).

NOTE: The emission factor of 30 lb VOC emitted / ton coating produced was established by EPA in 1995. This factor is adjusted by 0.70 for the manufacturers in the AQMD due to the effectiveness of the source-specific VOC control rules for the last 15 years. Please note that the first factor is applied to the total amount of solvent used in manufacturing process while the second factor is applicable to the facility's total coating produced.

### **Additional AQMD Guidelines and Requirements:**

Records of production and solvent use must be included in the final AER.

Contact District's AER Hotline at (909) 396-3660 if you have any questions about these guidelines.