

Guidelines for Reporting Emissions from the Use of Materials Containing Organic Compounds – December 2014

Depending on the method of application, emissions from the use of materials containing organic compounds include volatile organic compound (VOC), particulate matter (PM for sprayed coating), and toxic air contaminants/ozone depleting compounds (TAC/ODC) found in either or both toxic VOC or toxic PM form. The user is encouraged to use specific information found in material safety data sheets (MSDS) and/or technical data sheets (TDS) including: material VOC content, density, percent by weight of total solids, and percent by weight of individual toxic compounds. In the absent of specific data, certain default parameters are recommended for calculating PM (and toxic PM). These are solids content, transfer efficiency (when coatings are sprayed), and filter control efficiency.

VOC Emissions:

$$E_{\text{VOC}} = Q * EF * (1 - CE_{\text{overall}}) \quad \text{Eq. (1)}$$

Where:

E_{VOC} = Emissions from the use of VOC materials (lbs)

Q = Throughput (or quantity of materials in gallons or lbs)

EF = Emission Factor (lb/gal or lb/lb)

CE_{overall} = Overall Efficiency of the Control System (decimal) which is defined as:

$$CE_{\text{overall}} = CE_{\text{cap}} * CE_{\text{des}}$$

where:

CE_{cap} = Capture Efficiency of Control System (fraction)

CE_{des} = Destruction Efficiency of Control Equipment (fraction)

PM Emissions:

If the coating is atomized (sprayed), equation 1 can be modified for PM emissions as follows:

$$E_{\text{PM}} = Q * EF * (1 - TE) * (1 - CE_{\text{overall}}) \quad \text{Eq. (2)}$$

where:

E_{PM} = Emissions of total particulate matter (lbs)

Q = Throughput (or quantity of coatings applied in gallons or pounds)

EF = Emission Factor (lb/gal or lb/lb)

TE = Transfer efficiency (decimal)

CE_{overall} = Overall Efficiency of the Control System (decimal)

Default Factors for PM:

Emission Factor (or solids content)

EF = 3.0 lb/gallon of coating material or 0.375 lb/lb (or 37.5%)

Transfer Efficiency

AIR-ATOMIZED SPRAY	TE = 0.25
HVLP SPRAY	TE = 0.65
ELECTROSTATIC SPRAY	TE = 0.90
DIPPING, ROLLER, BRUSHES, SPONGES, etc.	TE = 1.00

PM Control Efficiency

CONVENTIONAL FILTERS	CE = 0.90
3-STAGE AEROSPACE NESHAP-COMPLAINT FILTERS:	CE = 0.95
HIGH EFFICIENCY PARTICLE ARRESTOR (HEPA):	CE = 0.9997
OPEN-AIR:	CE = 0.0

NOTE: Both equation (1) and (2) are applicable for estimating emissions of toxic air contaminants (TAC) and ozone depleting compounds (ODC), which can be part of either or both VOC and PM (namely toxic VOC and toxic PM). Information on MSDS/TDS may help the user in determining TAC/ODC emission factors in terms of lb/gallon of coating material or as a fraction (lb/lb) of coating material.

EXAMPLE

Company XYZ sprays coating onto aerospace parts with a special chromated primer inside a spray booth equipped with HEPA filters. The annual amount used is 30 gallons, per MSDS the VOC content is 2.62 lb/gal, the solids content is 9.43 lb/gal and the hexavalent chromium (Cr⁶⁺) is 0.68 lb/gal.

Data Entry Steps:

On the Process Reference screen, click on P1 to open process #1 for this spray booth:



On the next screen, click on “[Open](#)” for process information:

« Back to Emission Source Process Reference

Spray Coating/Spray Booth

Please provide specific information for every process associated with the organics used in spray coating/spray booth including usage, emission factor, and control efficiency (if any). You must select Material/Activity Code and throughput units before reporting emissions. Detailed instructions are available by clicking on Help icon in the tool bar.

Process
Optional: Mark as Completed

	AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Material/Activity Code	Material Description
Open	ES7		345678	P1			

Click here to [delete](#) this process.

Fill out the process information in the following screen the click “Save”

Edit Emission Process - Spray Coating/Spray Booth ✕

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Material/Activity Code	Material Description
ES7		345678	P1			

AER Device ID: ES7

PERMITTED

Process ID: P1

Process Comment:

Equipment:

Material / Activity *
Major Group:

Type of Operation:

Application Method:

Type of Material:

Material Description: *

Additional Rules:

AER Device Name: Spraybooth #1

Permit Device ID: AN: 345678

Process Name:

Save
Cancel

In the following screen, click on “Open” under step 2 for throughput information.

Spray Coating/Spray Booth

Please provide specific information for every process associated with the organics used in spray coating/spray booth including usage, emission factor, and control efficiency (if any). You must select Material/Activity Code and throughput units before reporting emissions. Detailed instructions are available by clicking on Help icon in the tool bar.

Process Optional: Mark as Completed

	AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Material/Activity Code	Material Description
Open	ES7		345678	P1	1124	Coating:Aerospace Assembly and Component Manufacturing Operations:HVLP Application:General Primer	Primer

Click here to [delete](#) this process.

Throughput

Annual Throughput	
Open	

Note that throughput types may be: Input (raw materials), Existing (already in the equipment), or Output (finished products). Click to **Save** the throughput data.

Edit Throughput Information - Spray Coating/Spray Booth

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Material/Activity Code	Material Description
ES7		345678	P1	1124	Coating:Aerospace Assembly and Component Manufacturing Operations:HVLP Application:General Primer	Primer

Annual Throughput

Usage (Annual Throughput) * gal *

Throughput Type *

Usage Comment

Reporting VOC Emissions:

In the following screen, click on the “Add New” button under **Criteria Emissions (lbs)** and fill out the required fields.

Process						Optional: Mark as Completed	
	AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Material/Activity Code	Material Description
Open	ES7		345678	P1	1124	Coating:Aerospace Assembly and Component Manufacturing Operations:HVLP Application:General Primer	Primer
Click here to delete this process.							

Throughput	
	Annual Throughput
Open	30.0 gal

Criteria Emissions (lbs)					
	Pollutant	EF	Unit	EF Data Source	Emissions
Add New					

In the following screen, select VOC from the Pollutant drop-down list and enter the emission factor. The overall control efficiency is zero because there is no add-on control system. Click “Save” to move on.

Open Criteria Emission Information - Spray Coating/Spray Booth							
AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Material/Activity Code	Material Description	
ES7		345678	P1	1124	Coating:Aerospace Assembly and Component Manufacturing Operations:HVLP Application:General Primer	Primer	
Annual Throughput							
30.0 gal							
Pollutant	VOC *						
Emission Factor (EF)	2.6200 * lbs/gal						
Overall Control Efficiency	0.00000						
Emission Factor Comment	<input type="text"/>						
Emission Factor Data Source	MSDS *						
Emissions	78.60 lbs						
Save							Cancel

Reporting PM Emissions:

The previous 2 steps can be repeated for other contaminants. Click on “Add New” button and select PM on Pollutant list and fill out the required information with default parameters as shown in the following screen. Click “Save” to move on.

The following screen shows the results of two pollutants: VOC and PM from spraying the primer. The procedures can be repeated for TAC/ODC as shown below by clicking on the TAC/ODC “Add New” button.

Throughput						
Annual Throughput						
Open	30.0 gal					
Criteria Emissions (lbs)						
	Pollutant	EF	Unit	EF Data Source	Emissions	
Open	VOC	2.6200	lbs / gal	MSDS	78.60	
Open	PM	3.3005	lbs / gal	MSDS	0.03	
Add New						
Toxic (TAC/ODC) Emissions (lbs)						
	TAC/ODC Group	CAS #	EF	Unit	EF Data Source	Emissions
Add New						

Reporting Toxic PM Emissions:

The following screen is selected (click on the **Add New** button) for reporting hexavalent chromium (Cr+6) in the primer using default parameters. Click “Save” to finish.

Open Toxic (TAC/ODC) Emission Information - Spray Coating/Spray Booth						
AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Material/Activity Code	Material Description
ES7		345678	P1	1124	Coating:Aerospace Assembly and Component Manufacturing Operations:HVLP Application:General Primer	Primer
Annual Throughput						
30.0 gal						
TAC/ODC Toxic Pollutants / Ozone Depleting Compounds						
TAC Group	13 - Chromium, hexavalent (and compounds)					
CAS # (Pollutant)	18540299 - Chromium, hexavalent (and compounds)					
PM Particulate Matter						
Solid Content	0.6800		* lbs/gal			
Transfer Efficiency	0.65		*		<input checked="" type="checkbox"/> Use default	
Emission Factor (EF)	2.38000e-1		* lbs/gal			
Overall Control Efficiency	0.99970		<input type="checkbox"/> Use default			
Emission Factor Comment	<input type="text"/>					
Emission Factor Data Source	MSDS		<input type="text"/>			
Emissions	2.142e-3 lbs					
Click here to delete this Emission.						
<input type="button" value="Save"/> <input type="button" value="Cancel"/>						