

FORM INV-2 EMISSION POINT DESCRIPTION

1. Company/Facility Name		ACME CORPORATION		2. Form INV-2 Page		1	of	1
3. Release Point Identifier		EP-001						
4. Is this release point used as an emergency bypass stack?				No <input checked="" type="checkbox"/>	Yes <input type="checkbox"/>			
If YES, for which release point(s)? List release point identifiers:								
5. Release Point Type								
Downward-facing Vent	<input type="checkbox"/>				Indoor Vented	<input type="checkbox"/>		
Fugitive (specify)	<input type="checkbox"/>				Vertical	<input type="checkbox"/>		
Goose Neck	<input type="checkbox"/>				Vertical with Rain Cap	<input checked="" type="checkbox"/>		
Horizontal	<input type="checkbox"/>							
6. Release Point Description		PAINT BOOTH STACK						
7. Operating Status		Operating <input checked="" type="checkbox"/>	Permanently Shutdown <input type="checkbox"/>		Temporarily Shutdown <input type="checkbox"/>			
8. Operating Status Date (Please enter the date the shutdown occurred. The status date should be blank if the status above was entered as operating.)								
9. Stack Height Above Ground		18	feet					
10. Stack Shape and Dimensions: (interior dimensions at exit point)								
Circular Diameter:		<input checked="" type="checkbox"/>	2.5	feet				
Rectangular Dimensions:		<input type="checkbox"/>		feet	x		feet	
Composition Of Exhaust Stream								
Exhaust Stream Characteristics		Release Point Composition of Exhaust Stream			Units of Measure			
11. Temperature		68			Degree Fahrenheit			
12. Flow Rate		18,000			<input checked="" type="checkbox"/> ACFM <input type="checkbox"/> SCFM			
13. Bypass Stacks								
Bypass Stack – Release Point Identifier								
Bypass Stack Description								
Bypass Stack – Release Point Identifier								
Bypass Stack Description								
14. List of Emission Unit Identifiers Venting Through This Release Point Identifier								
Emission Unit Identifier	Emission Unit Identifier	Emission Unit Identifier	Emission Unit Identifier					
EU-001								

FORM INV-4 PROCESS DESCRIPTION - ACTUAL EMISSIONS

1. Company/Facility Name		ACME HOSPITAL			2. Form INV-4 Page		1	of	1
3. Release Point Identifier		EP-001							
4. Release Point Description		SPRAY PAINT BOOT							
5. Emission Year		2017							
6. Emission Unit Identifier		EU-001							
7. SCC Number		40202501							
8. Description of Process		SPRAY PAINTING							
Annual Throughput									
9. Annual Throughput		1,300							
10. <u>Throughput Unit of Measure</u>		GALLONS							
11. Throughput Type (Input, Output, or Existing)		I							
12. <u>Throughput Material</u>		PAINT							
Actual Operating Rate/Schedule									
13. Average Hours/Day		8							
14. Average Days/Week		5							
15. Average Weeks/Year		52							
16. Actual Hours For Year		2,080							
Seasonal Operations									
17. January, February & December (%)		25							
18. March, April & May (%)		25							
19. June, July & August (%)		25							
20. September, October & November (%)		25							
Associated Control Devices									
21. Control Device Identifier									
22. Control Device Description									
23. Control Device Identifier									
24. Control Device Description									
ACTUAL EMISSIONS									
25. Air Pollutant	26. Emission Factor	27. Emission Factor Units of Measure	28. Source of Emission Factor	29. Ash or Sulfur %	30. Combined Control Efficiency	31. Transfer Efficiency	32. Actual Estimated Emissions (Tons)		
PM-2.5	6.15	LBS/GAL	MASS BALANCE		95	65	0.07		
PM-10	6.15	LBS/GAL	MASS BALANCE		95	65	0.07		
SO ₂									
NOX									
VOC	2.51	LBS/GAL	MASS BALANCE				1.63		
CO									
Lead									
Ammonia									

ACTUAL EMISSIONS – Individual HAPs and additional regulated air pollutants – list each individual pollutant name in Column 25							
Xylene	0.49	LBS/GAL	MASS BALANCE				0.32
Toluene	0.42	LBS/GAL	MASS BALANCE				0.27

*Calculation Methods: CEMS – Engineering Judgment – Manufacturer’s Specification – Material Balance – Other (Specify) – State or Local Speciation Profile – Site Specific – Stack Test – Trade Group – US EPA - Vendor

FORM INV-5 CALCULATIONS

1. Company/Facility Name	ACME CORPORATION	2. Form INV-5 Page	1	of	3
3. Release Point Identifier	EP-001				
4. Emission Unit Identifier	EU-001				
5. SCC Number:	40202501				

Calculations are provided in support of information reported on Form INV – 4 for the SCC Number listed above.

6. Emissions Calculations

ACME CORPORATION APPLIES A BASE COAT AND A TOP COAT TO EACH WAGON IN THE SAME SPRAY BOOTH. THE PAINT COMES IN FIVE GALLONS PAILS AND IS SPRAYED DIRECTLY FROM THE CONTAINER WITH NO THINNING OR MIXING AT THE FACILITY. ACME CORPORATION SPRAYED A TOTAL OF 1,300 GALLONS (500 GALLONS OF BASECOAT AND 800 GALLONS OF TOP COAT). THE FILTER USED IN THE BOOTH HAS A 95 PERCENT PARTICULATE REMOVAL EFFICIENCY.

MATERIAL BALANCE (ALSO KNOWN AS MASS BALANCE) UTILIZES THE RAW MATERIAL USAGE RATE TO ESTIMATE THE AMOUNT OF POLLUTANT EMITTED. IN THIS METHOD, EMISSIONS ARE ESTIMATED AS THE DIFFERENCE BETWEEN MATERIAL INPUT AND MATERIAL OUTPUT ACROSS A PROCESS. THIS METHOD IS TYPICALLY USED IN SURFACE COATING PROCESSES. INFORMATION REGARDING THE AMOUNT OF POLLUTANTS IN A MATERIAL CAN BE FOUND ON THE SAFETY DATA SHEET (SDS).

MOST MATERIAL BALANCES ASSUME THAT ALL SOLVENT USED IN A PROCESS WILL EVAPORATE TO BECOME AIR EMISSIONS SOMEWHERE AT THE FACILITY. IN THESE CASES, EMISSIONS EQUAL THE AMOUNT OF SOLVENT CONTAINED IN THE SURFACE COATING.

FROM INFORMATION FOUND ON PAINT SDS THE TOP AND BASE COATS HAVE THE FOLLOWING CHARACTERISTICS AND HAP COMPONENTS:

TOP COAT (8.75 LBS/GAL)

- VOC = 25%
- SOLIDS = 75%
- XYLENE = 8%

BASE COAT (7.21 LBS/GAL)

- VOC = 42%
- SOLIDS = 58%
- XYLENE = 2%
- TOLUENE = 15%

NOTE: ALL PERCENTAGES ARE WEIGHT PERCENTAGES AND EXPRESSED AS PERCENT OF TOTAL PAINT WEIGHT.

FORM INV-5 CALCULATIONS

1. Company/Facility Name	ACME CORPORATION	2. Form INV-5 Page	2	of	3
3. Release Point Identifier	EP-001				
4. Emission Unit Identifier	EU-001				
5. SCC Number:	40202501				

Calculations are provided in support of information reported on Form INV – 4 for the SCC Number listed above.

6. Emissions Calculations

ACTUAL EMISSIONS:

STEP 1 - CALCULATING ACTUAL VOC AND HAP EMISSIONS

TO CALCULATE ACTUAL VOC AND HAP EMISSIONS YOU MUST CALCULATE THE EMISSIONS FROM EACH COATING THEN ADD THEM TOGETHER.

$$(\text{PAINT USED GAL/YR}) * (\text{PAINT WEIGHT LB/GAL} * \text{POLLUTANT\%}) * (1 \text{ TON}/2,000 \text{ LBS})$$

$$\text{VOC - TOP COAT: } (800 \text{ GAL}) * (8.75 \text{ LBS/GAL} * 0.25) = 1,750 \text{ LB} * (1 \text{ TON}/2,000 \text{ LBS}) = 0.875 \text{ TONS}$$

$$\text{VOC - BASE COAT: } (500 \text{ GAL}) * (7.21 \text{ LBS/GAL} * 0.42) = 1,514 \text{ LBS} * (1 \text{ TON}/2,000 \text{ LBS}) = 0.75 \text{ TONS}$$

$$= 1.63 \text{ TONS OF VOC}$$

$$\text{XYLENE - TOP COAT: } (800 \text{ GAL}) * (8.75 \text{ LBS/GAL} * 0.08) = 560 \text{ LB} * (1 \text{ TON}/2,000 \text{ LBS}) = 0.28 \text{ TONS}$$

$$\text{XYLENE - BASE COAT: } (500 \text{ GAL}) * (7.21 \text{ LBS/GAL} * 0.02) = 72.1 \text{ LB} * (1 \text{ TON}/2,000 \text{ LBS}) = 0.04 \text{ TONS}$$

$$= 0.32 \text{ TONS OF XYLENE}$$

$$\text{TOLUENE - TOP COAT: } (800 \text{ GAL}) * (8.75 \text{ LBS/GAL} * 0.00) = 0.00 \text{ LB} * (1 \text{ TON}/2,000 \text{ LBS}) = 0.00 \text{ TONS}$$

$$\text{TOLUENE - BASE COAT: } (500 \text{ GAL}) * (7.21 \text{ LBS/GAL} * 0.15) = 540.75 \text{ LB} * (1 \text{ TON}/2,000 \text{ LBS}) = 0.27 \text{ TONS}$$

$$= 0.27 \text{ TONS}$$

STEP 2 - CALCULATING ACTUAL PM-2.5 AND PM-10 EMISSIONS

TO CALCULATE ACTUAL PM-2.5 AND PM-10 EMISSIONS, THE SAME FORMULA IS USED BUT TRANSFER EFFICIENCY AND CONTROL EFFICIENCY MUST BE TAKEN INTO ACCOUNT.

$$\text{TOP COAT: } (800 \text{ GAL}) * (8.75 \text{ LBS/GAL} * 0.75) * (1-0.65) * (1-0.95) = 91.88 \text{ LBS} * (1 \text{ TON}/2,000 \text{ LBS}) = 0.05 \text{ TONS}$$

$$\text{BASE COAT: } (500 \text{ GAL}) * (7.21 \text{ LBS/GAL} * 0.58) * (1-0.65) * (1-0.95) = 36.59 \text{ LBS} * (1 \text{ TON}/2,000 \text{ LBS}) = 0.02 \text{ TONS}$$

$$= 0.07 \text{ TONS}$$

NOTE: THIS EXAMPLE IS FOR A PAINTING OPERATION WHERE THE PAINT IS NOT THINNED ON-SITE. IF THINNING OCCURS ON-SITE THIS MUST BE TAKEN INTO ACCOUNT TO DETERMINE THE MAXIMUM CONSTITUENTS OF EACH COATING. FOR ADDITIONAL GUIDANCE ON THIS, CONTACT THE DEPARTMENT OF NATURAL RESOURCES.

STEP 3 - CALCULATE THE EMISSION FACTOR

TO DETERMINE THE EMISSION FACTOR TO REPORT IN BOX 26, DIVID THE TOTAL TONS OF EMISSIONS BY THE GALLONS USED AND CONVERT TONS TO POUNDS.

$$[(\text{TONS}) / (\text{GALLONS})] * (2,000 \text{ LBS}/\text{TON}) = \text{LBS}/\text{GAL}$$

$$\text{VOCS} = (1.63 \text{ TONS}/1,300 \text{ GALLONS} * 2,000 \text{ LBS}/\text{TON}) = 2.51 \text{ LBS}/\text{GAL}$$

$$\text{XYLENE} = (0.32 \text{ TONS}/1,300 \text{ GALLONS} * 2,000 \text{ LBS}/\text{TON}) = 0.49 \text{ LBS}/\text{GAL}$$

$$\text{TOLUENE} = (0.27 \text{ TONS}/1,300 \text{ GALLONS} * 2,000 \text{ LBS}/\text{TON}) = 0.42 \text{ LBS}/\text{GAL}$$

FORM INV-5 CALCULATIONS

1. Company/Facility Name	ACME CORPORATION	2. Form INV-5 Page	3	of	3
3. Release Point Identifier	EP-001				
4. Emission Unit Identifier	EU-001				
5. SCC Number:	40202501				
Calculations are provided in support of information reported on Form INV – 4 for the SCC Number listed above.					
6. Emissions Calculations					
<p>ACTUAL EMISSIONS: STEP 3 - CALCULATE THE EMISSION FACTOR (CONTINUED)</p> <p>PM-2.5 = (0.07 TONS/1,300 GALLONS * 2,000 LBS/TON) * (1/1-0.95) * (1/1-0.65) = 6.15 LBS/GAL PM-10 = (0.07 TONS/1,300 GALLONS * 2,000 LBS/TON) * (1/1-0.95) * (1/1-0.65) = 6.15 LBS/GAL</p>					