

FORM 2.5 ORGANIC LIQUID STORAGE - FIXED ROOF TANK

Facility Name	FIPS County No.	Plant No.	Year of Data
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Please provide all the following information if this form is being used to derive emission factors for a liquid storage tank with capacities greater than 250 gallons. Form 2.5L may be used to provide tank information for other sources of emission factors. Please include all organic liquids, petroleum products or fuels.

[1] TANK INFORMATION

Point (Tank) Identification No.	AIRS ID-Pt	Color (Roof)	Color (Shell)
Diameter (Ft)		Paint Condition	Solar Absorptance
Height (Ft)	Length (Ft)	Type of Roof <input type="checkbox"/> Cone <input type="checkbox"/> Dome <input type="checkbox"/> Other (Specify)	Roof Height (Ft)
Capacity (in Thousands of Gallons)			Vapor Space Outage (Ft)
Vent Pressure Setting	Vent Vacuum Setting	Total Solar Insolation Factor (BTU/Sq Ft)	

[2] CHEMICAL INFORMATION

Chemical		Working Loss Product Factor	
Vapor Molecular Wt	CAS Number	LBT (Rankine)	D-Min-AT (Rankine)
LST - [Average Liquid Surface Temperature (Rankine)]		DVTR (Rankine)	D-Max-AT (Rankine)
Avg:	Max:	Min:	
VP - [Vapor Pressure at LST (psia)]		DVPR (psi)	D-Avg-AT (Rankine)
Throughput (in Thousands of Gallons)		Number of Turnovers	Turnover Factor

[3] VOC EMISSION CALCULATIONS

BREATHING LOSS (Lbs/Yr)

$$\text{BREATHING LOSS} = 26.714 \times \{\text{Diameter}\}^2 \times \{\text{Vapor Space Outage}\} \times \{\text{Vapor Molecular Weight}\} \times \{\text{VP}\} \times \left[\frac{\{\text{DVTR}\}}{\{\text{LST}\}} + \left[\frac{\{\text{DVPR}\} - (\{\text{Vent Pressure Setting}\} - \{\text{Vent Vacuum Setting}\})}{14.7 - \{\text{VP}\}} \right] \right] / [\{\text{LST}\} \times [1 + (0.053 \times \{\text{VP}\} \times \{\text{Vapor Space Outage}\})]]$$

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WORKING LOSS (Lbs/Yr)

$$\text{WORKING LOSS} = 0.0238 \times \{\text{Vapor Molecular Wt}\} \times \{\text{VP}\} \times \{\text{Throughput}\} \times \{\text{Turnover Factor}\} \times \{\text{Working Loss Product Factor}\}$$

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BREATHING LOSS EMISSION FACTOR (Lbs VOC per 1,000 Gallons Capacity) and SCC

$$\text{BREATHING LOSS EMISSION FACTOR} = \{\text{Breathing Loss}\} / \{\text{Capacity}\}$$

Breathing Loss SCC

=

WORKING LOSS EMISSION FACTOR (Lbs VOC per 1000 Gallons Stored) and SCC

$$\text{WORKING LOSS EMISSION FACTOR} = \{\text{Working Loss}\} / \{\text{Throughput}\}$$

Working Loss SCC

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Enter the CAPACITY (Breathing Loss) and THROUGHPUT (Working Loss) as the ANNUAL THROUGHPUT in Block 4 on separate Forms 2.0 making sure the SCC matches the Breathing Loss and Working Loss. Also enter the calculated BREATHING LOSS EMISSION FACTOR and WORKING LOSS EMISSION FACTOR in the VOC Box in Block 7 of the respective Form 2.0.

FORM 2.5L GENERAL LIQUID STORAGE TANK INFORMATION

Facility Name		FIPS County No.	Plant No.	Year of Data	
Point or Tank ID No.	AIRS ID-Pt	Diameter (Ft)	Height/Length	SCC (Breathing)	SCC (Working)
Capacity (1,000 Gallons Capacity)		Throughput (1,000 Gallons)		Tanks Program Used? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Chemical		CAS Number		Choose Type of Tank <input type="checkbox"/> Fixed Roof <input type="checkbox"/> Vertical <input type="checkbox"/> Floating Roof <input type="checkbox"/> Horizontal	
Point or Tank ID No.	AIRS ID-Pt	Diameter (Ft)	Height/Length	SCC (Breathing)	SCC (Working)
Capacity (1,000 Gallons Capacity)		Throughput (1,000 Gallons)		Tanks Program Used? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Chemical		CAS Number		Choose Type of Tank <input type="checkbox"/> Fixed Roof <input type="checkbox"/> Vertical <input type="checkbox"/> Floating Roof <input type="checkbox"/> Horizontal	
Point or Tank ID No.	AIRS ID-Pt	Diameter (Ft)	Height/Length	SCC (Breathing)	SCC (Working)
Capacity (1,000 Gallons Capacity)		Throughput (1,000 Gallons)		Tanks Program Used? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Chemical		CAS Number		Choose Type of Tank <input type="checkbox"/> Fixed Roof <input type="checkbox"/> Vertical <input type="checkbox"/> Floating Roof <input type="checkbox"/> Horizontal	
Point or Tank ID No.	AIRS ID-Pt	Diameter (Ft)	Height/Length	SCC (Breathing)	SCC (Working)
Capacity (1,000 Gallons Capacity)		Throughput (1,000 Gallons)		Tanks Program Used? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Chemical		CAS Number		Choose Type of Tank <input type="checkbox"/> Fixed Roof <input type="checkbox"/> Vertical <input type="checkbox"/> Floating Roof <input type="checkbox"/> Horizontal	
Point or Tank ID No.	AIRS ID-Pt	Diameter (Ft)	Height/Length	SCC (Breathing)	SCC (Working)
Capacity (1,000 Gallons Capacity)		Throughput (1,000 Gallons)		Tanks Program Used? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Chemical		CAS Number		Choose Type of Tank <input type="checkbox"/> Fixed Roof <input type="checkbox"/> Vertical <input type="checkbox"/> Floating Roof <input type="checkbox"/> Horizontal	

FORM 2.6 ORGANIC LIQUID STORAGE - FLOATING ROOF TANK

Facility Name	FIPS County No.	Plant No.	Year of Data
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Please provide all the following information if this form is being used to derive emission factors for a liquid storage tank with capacities greater than 250 gallons. Please include all organic liquids and petroleum products or fuels.

[1] TANK INFORMATION

Point or Tank ID No.	AIRS ID-Pt	Type of Construction <input type="checkbox"/> Riveted <input type="checkbox"/> Welded	Primary Seal <input type="checkbox"/> Metallic Shoe <input type="checkbox"/> Liquid-Mounted <input type="checkbox"/> Vapor Mounted
Capacity (in Thousands of Gallons)	Type of Roof <input type="checkbox"/> Internal <input type="checkbox"/> External		Secondary Seal <input type="checkbox"/> None <input type="checkbox"/> Shoe-Mounted <input type="checkbox"/> Rim-Mounted <input type="checkbox"/> Weather Shield
Diameter (Ft)	Length of Seam (Ft)		
Seal Factors, a & b	Number of Columns		Area of Deck (Sq Ft)
Clingage Factor	Effective Column Diameter (Ft)		Total Fitting Loss Factor (Lb-Mole/Yr)
Shell Condition <input type="checkbox"/> Light rust <input type="checkbox"/> Dense rust <input type="checkbox"/> Gunite lined	Deck <input type="checkbox"/> Bolted <input type="checkbox"/> Welded		Seam Loss Factor (Lb-Mole/Ft-Yr)

[2] CHEMICAL INFORMATION

Chemical	Throughput (1,000 Gal/Yr)	Vapor Pressure at Storage Temp (psia)
Vapor Molecular Wt	Number of Turnovers	Vapor Pressure Function $= \frac{[(\text{Vapor Pressure}) / 14.7]}{[1 + (1 - ((\text{Vapor Pressure}) / 14.7))^{0.5}]^2}$
Liquid Density (Lb/Gal)	Product Factor	

[3] METEOROLOGICAL CONDITIONS

Average Wind Speed (Mph)	Seal Related Wind Exponent	Average Ambient Temperature (F)
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[4] VOC EMISSION CALCULATIONS

RIM SEAL LOSS (Lbs/Yr)	WITHDRAWAL LOSS (Lbs/Yr)	
RIM SEAL LOSS = $\{(\text{Seal Factor, a}) + \{\text{Seal Factor, b}\} \times \{\text{Avg Wind Speed}\}^{\{\text{Seal Related Wind Exponent}\}}\} \times \{\text{Diameter}\} \times \{\text{Vapor Molecular Wt}\} \times \{\text{Product Factor}\} \times \{\text{Vapor Pressure Function}\}$	WITHDRAWAL LOSS = $0.943 \times \{\text{Throughput}\} \times 23.81 \times \{\text{Clingage Factor}\} \times \{\text{Liquid Density}\} / \{\text{Diameter}\} \times [1 + \{\{\text{No. of Columns}\} \times \{\text{Effective Column Diameter}\} / \{\text{Diameter}\}\}]$	
=	=	
DECK FITTING LOSS (Lbs/Yr)	DECK SEAM LOSS (Lbs/Yr)	
DECK FITTING LOSS = $\{\text{Total Deck Fitting Loss Factor}\} \times \{\text{Molecular Wt}\} \times \{\text{Product Factor}\} \times \{\text{Vapor Pressure Function}\}$	DECK SEAM LOSS = $\{\text{Diameter}\}^2 \times \{\text{Length of Seam}\} / \{\text{Area of Deck}\} \times \{\text{Seam Loss Factor}\} \times \{\text{Molecular Wt}\} \times \{\text{Product Factor}\} \times \{\text{Vapor Pressure Function}\}$	
=	=	
WORKING LOSS EMISSION FACTOR	SCC	BREATHING LOSS EMISSION FACTOR
WORKING LOSS EMISSION FACTOR = $\{\text{Withdrawal Loss}\} / \{\text{Throughput}\}$	Working Loss SCC Breathing Loss SCC	BREATHING LOSS EMISSION FACTOR = $\{(\text{Rim Seal Loss}) + \{\text{Deck Fitting Loss}\} + \{\text{Deck Seam Loss}\}\} / \{\text{Capacity}\}$
=	=	=

FORM 2.7 HAUL ROAD FUGITIVE EMISSIONS WORKSHEET

Facility Name	FIPS County No.	Plant No.	Year of Data
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***** PLEASE NOTE *****

If the sum of all Vehicle Miles Traveled (VMT) for all haul roads and trucks is less than 100 VMT, then the PM10 emissions for all the haul roads do not need to be reported on these forms. However, if the emissions are not reported, documentation on the actual annual VMT figures for the facility must be provided.

[1] HAUL ROAD INFORMATION

Point No.	AIRS ID-Pt	SCC	Seg No.	Type of Dust Control (Check One)	Control Eff %
				<input type="checkbox"/> Surfactant Spray	90
				<input type="checkbox"/> Water Spray Documented	> 50
				<input type="checkbox"/> Water Spray	50
				<input type="checkbox"/> No Controls	0
				<input type="checkbox"/> Other (Specify)	0
Length of Road (Miles)	Silt Content (%) <small>(Default = 8.3 %)</small>	Surface Material of Road			
Surface Material Moisture Content (%) <small>(must reference dry, worst-case conditions) (Default = 0.2 %)</small>	Days of Rain with at least 0.01" per Year <small>(Default = 105 Days)</small>				

[2] HAUL TRUCK INFORMATION

Make/Model	Unloaded Truck Wt (Tons)
Average Wt of Material per Load (Tons)	Average Loaded Truck Wt (Tons)
Average Truck Speed (MPH)	

[3] MATERIAL HAULED

Type of Material(s) Hauled	List any permit conditions limiting the amount hauled.
Annual Amount Hauled (Tons)	Maximum Hourly Amount Hauled (Tons)

[4] CALCULATION OF ANNUAL VEHICLE MILES TRAVELED (VMT)

ANNUAL VMT =
 $2 \times \{ \text{Length of Haul Road} \} \times \{ \text{Annual Amount Hauled} \} / \{ \text{Average Wt of Material per Load} \}$

Annual VMT	Reportable Level = the Sum of all Road VMTs > 100	Maximum Hourly VMT
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[5] Calculation of Haul Road Emission Factor

PM10 EMISSION FACTOR =
 $2.6 \times \{ \{ \text{Silt Content} (\%) \} / 12 \}^{0.8} \times \{ [\{ \{ \text{Unloaded Truck Wt} \} + \{ \text{Average Loaded Truck Wt} \} / 6]^{0.4} \times [\{ 365 - \{ \text{Days of Rain} \} \} / 365] / [\{ \{ \text{Surface Material Moisture Content} (\%) \} / 0.2]^{0.3} \}$
 * If Average Truck Speed is < 15 (MPH), multiply the equation by (Average Truck Speed / 15)

PM10 Emission Factor	Lbs PM10 / VMT
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The PM10 emission factor for the haul roads can be calculated using the equation from the AP 42 section on Unpaved Haul Roads (Section 13.2.2) provided in Block 5 of this worksheet. When using these equations, PM10 emission factors should be calculated for each separate haul road and type of haul truck. The Stone Quarrying SCC number (3-05-020-11) should be used as the SCC number on Form 2.0. The calculated PM10 emission factor should be entered in the PM10 Box in Block 7 on Form 2.0.

A more detailed discussion on dust control method and the the resulting Control Efficiency (%) can be found in the AP 42 Section 13.2.2. The appropriate dust control method should be checked in Block 1 and the control efficiency should be entered in the PM10 box of Block 9 on Form 2.0.

ALTERNATE METHODS TO ESTABLISH THE HUAL ROAD PM10 EMISSION FACTOR

Instead of using this form to calculate the PM10 emission factor for haul roads, the Source Classification Code (SCC) for Stone Quarrying and Processing Haul Road Emissions (3-05-020-11) may be used as a default SCC number. The PM10 emission factor to use with this SCC number is 6.2 Lbs of PM10 per VMT.

FORM 2.8 STORAGE PILE WORKSHEET

Facility Name	FIPS County No.	Plant No.	Year of Data
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[1] STORAGE PILE INFORMATION

Point No.	AIRS ID-Pt	SCC	Seg No.	Type of Material Stored
Moisture Content (%) <small>(Default = 0.7 %)</small>			Area of Storage Pile (Acres)	
Silt Content (%) <small>(Default = 1.6 %)</small>			Raw Material Loading Method (Check One)	Raw Material Unloading Method (Check One)
Storage Duration (Days)			<input type="checkbox"/> Barge	<input type="checkbox"/> Barge
Annual Amount Stored (Tons)			<input type="checkbox"/> Rail	<input type="checkbox"/> Rail
Maximum Hourly Amount Stored			<input type="checkbox"/> Truck	<input type="checkbox"/> Truck
			<input type="checkbox"/> Conveyor	<input type="checkbox"/> Conveyor
			<input type="checkbox"/> Other (Specify)	<input type="checkbox"/> Other (Specify)

[2] OTHER FACTORS AFFECTING EMISSION RATES

Mean Wind Speed (Mph) <small>(Default = 10 Mph)</small>	% of Time Wind > 12 Mph <small>(Default = 32 %)</small>
Dry Days per Year <small>(Default = 260 Days)</small>	Vehicle Activity Factor <small>(Default = 1.0)</small>

[3] STORAGE PILE EMISSION FACTOR CALCULATIONS

[3-A-1] LOAD IN-LOAD OUT FACTOR =
 $.00224 \times ((\text{Mean Wind Speed}) / 5)^{1.3} / ((\text{Moisture Content (\%)}) / 2)^{1.4}$

Load In-Load Out Factor

[3-A-2] VEHICLE ACTIVITY FACTOR =
 $0.05 \times ((\text{Silt Content (\%)}) / 1.5) \times ((\text{Dry Days per Year}) / 235) \times (\text{Vehicle Activity Factor})$

Vehicle Activity Factor

[3-B] WIND EROSION FACTOR =
 $0.85 \times ((\text{Silt Content (\%)}) / 1.5) \times ((\text{Storage Duration(Days)}) / ((\text{Dry Days per Year}) / 235) \times ((\text{\% of Time Wind > 12 mph}) / 15) \text{ lb/acre}$

Wind Erosion Factor

[4] STORAGE PILE PM10 EMISSION FACTOR

ACTIVITY PM10 EMISSION FACTOR =
 $\{[3-A-1] \text{ Load In-Load Out Factor}\} + \{[3-A-2] \text{ Vehicle Activity Factor}\}$

[4-A] Activity PM10 Emission Factor lb PM10/Ton	[4-B] Wind Erosion PM10 Emission Factor lb PM10/Acre
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***** PLEASE NOTE *****

If you use a Source Classification Code (SCC) number and Emission Factor from the list in the instructions for this form, make sure to complete Block 1, Storage Pile Information for each storage pile.

FORM 2.9 STACK TEST/CONTINUOUS EMISSION MONITORING WORKSHEET

Facility Name		FIPS County No.	Plant No.	Year of Data
Point No.	AIRS ID-Pt	Source Classification Code (SCC)	Seg No.	Stack No.
Pollutant Tested	CAS Number	NOTE: Use a separate worksheet for each pollutant tested.		
[1] EMISSION SOURCE INFORMATION				
Equipment Make/Model				
Type of Control Device		Control Efficiency (%)		
Limitations on emissions, production or operating time (if any)				
[2] STACK TEST INFORMATION				
Testing Firm Name and Address			EPA Method(s) Used	
Test Date(s)	Results		Compliance <input type="checkbox"/> Yes <input type="checkbox"/> No	
Test Technique (Check One) <input type="checkbox"/> Operational Rate <input type="checkbox"/> Maximum Design Rate <input type="checkbox"/> Both		Latest Calibration of Testing Equipment		
Agency Observing Test <input type="checkbox"/> EPA <input type="checkbox"/> MO DNR <input type="checkbox"/> Other		Name of Observer(s)		
[3] CONTINUOUS EMISSION MONITORING INFORMATION				
Concentration of Pollutant	Units	Flow Rate of Stack	Units	
Latest Calibration of Monitor		Results of Calibration		
Monitor Averaging Period		% Monitor Down Time		
[4] EMISSION FACTOR CALCULATION				
Emission Rate *	Units	Lbs/Hr	*NOTE: Documentation should include summary page information from the test data to verify the emission and production rate.	
Production Rate *	Units/Hr			
EMISSION FACTOR = [(Emission Rate) / (Production Rate)] / [1 - (Control Efficiency (%)) / 100]				
Emission Factor			Units	
Enter the EMISSION FACTOR in the appropriate box in Block 7 on Form 2.0, Emission Point Information. If applicable, enter the CONTROL DEVICE TYPE and CONTROL EFFICIENCY (%) in Block 3 on Form 2.0.				