

3-550 661 Tanks

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification
User Identification: General AO
City:
State:
Company:
Type of Tank: Vertical Fixed Roof Tank
Description:

Tank Dimensions
Shell Height (ft): 16.00
Diameter (ft): 16.00
Liquid Height (ft): 15.50
Avg. Liquid Height (ft): 15.50
Volume (gallons): 23,312.82
Turnovers: 30.03
Net Throughput(gal/yr): 700,000.00
Is Tank Heated (y/n): Y

Paint Characteristics
Shell Color/Shade: Gray/Light
Shell Condition: Good
Roof Color/Shade: Gray/Light
Roof Condition: Good

Roof Characteristics
Type: Cone
Height (ft): 0.25
Slope (ft/ft) (Cone Roof): 0.03

Breather Vent Settings
Vacuum Settings (psig): 0.00
Pressure Settings (psig): 0.00

Meteorological Data used in Emissions Calculations: Salt Lake City, Utah (Avg Atmospheric Pressure = 12.64 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

General AO - Vertical Fixed Roof Tank

Mixture/Component	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
	Month	Avg.	Min.		Max.	Avg.	Min.					
Crude oil (RVP 5)	All	140.00	140.00	140.00	11.2303	11.2303	11.2303	50.0000			207.00	Option 4: RVP=5

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

General AO - Vertical Fixed Roof Tank

Annual Emission Calculations

Standing Losses (lb):	0.0000
Vapor Space Volume (cu ft):	117.2861
Vapor Density (lb/cu ft):	0.0673
Vapor Space Expansion Factor:	0.0000
Vented Vapor Saturation Factor:	0.7423
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	117.2861
Tank Diameter (ft):	16.0000
Vapor Space Outage (ft):	0.5833
Tank Shell Height (ft):	16.0000
Average Liquid Height (ft):	15.5000
Roof Outage (ft):	0.0833
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.0833
Roof Height (ft):	0.2500
Roof Slope (ft/ft):	0.0300
Shell Radius (ft):	8.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0873
Vapor Molecular Weight (lb/lb-mole):	50.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	11.2303
Daily Avg. Liquid Surface Temp. (deg. R):	599.6700
Daily Average Ambient Temp. (deg. F):	51.9625
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	599.6700
Tank Paint Solar Absorptance (Shell):	0.3400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1.4521184
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0000
Daily Vapor Temperature Range (deg. R):	0.0000
Breather Vent Press. Setting Range (psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	11.2303
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	11.2303
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	11.2303
Daily Avg. Liquid Surface Temp. (deg. R):	599.6700
Daily Min. Liquid Surface Temp. (deg. R):	599.6700
Daily Max. Liquid Surface Temp. (deg. R):	599.6700
Daily Ambient Temp. Range (deg. R):	23.3583
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.7423
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	11.2303
Vapor Space Outage (ft):	0.5833

TANKS 4.0 Report

Working Losses (lb):	7,018.9309
Vapor Molecular Weight (lb/lb-mole):	50.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	11.2303
Annual Net Throughput (gallyr.):	700,000.0000
Annual Turnovers:	30.0284
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	23,312.8163
Maximum Liquid Height (ft):	15.5000
Tank Diameter (ft):	16.0000
Working Loss Product Factor:	0.7500
Total Losses (lb):	7,018.9309

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

General AO - Vertical Fixed Roof Tank

Components	Losses (lbs)			Total Emissions
	Working Loss	Breathing Loss		
Crude oil (RVP 5)	7,018.93	0.00		7,018.93

$$x(3) = 21,056.19 = 10.53 \text{ tpy}$$

4-400 661 Tanks

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification
User Identification: General AO
City:
State:
Company:
Type of Tank: Vertical Fixed Roof Tank
Description:

Tank Dimensions
Shell Height (ft): 20.00
Diameter (ft): 12.00
Liquid Height (ft): 19.50
Avg. Liquid Height (ft): 19.50
Volume (gallons): 16,497.58
Turnovers: 30.03
Net Throughput(gal/yr): 525,000.00
Is Tank Heated (y/n): Y

Paint Characteristics
Shell Color/Shade: Gray/Light
Shell Condition: Good
Roof Color/Shade: Gray/Light
Roof Condition: Good

Roof Characteristics
Type: Cone
Height (ft): 0.25
Slope (ft/ft) (Cone Roof): 0.04

Breather Vent Settings
Vacuum Settings (psig): 0.00
Pressure Settings (psig): 0.00

Meteorological Data used in Emissions Calculations: Salt Lake City, Utah (Avg Atmospheric Pressure = 12.64 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

General AO - Vertical Fixed Roof Tank

Mixture/Component	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
	Month	Avg.	Min.		Max.	Avg.	Min.					
Crude oil (RVP 5)	All	140.00	140.00	140.00	11.2303	11.2303	11.2303	50.0000			207.00	Option 4: RVP=5

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

General AO - Vertical Fixed Roof Tank

Annual Emission Calculations

Standing Losses (lb):	0.0000
Vapor Space Volume (cu ft):	65.9734
Vapor Density (lb/cu ft):	0.0873
Vapor Space Expansion Factor:	0.0000
Vented Vapor Saturation Factor:	0.7423
Tank Vapor Space Volume:	65.9734
Vapor Space Volume (cu ft):	12.0000
Tank Diameter (ft):	0.5833
Vapor Space Outage (ft):	20.0000
Tank Shell Height (ft):	19.5000
Average Liquid Height (ft):	0.0833
Roof Outage (ft):	
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.0833
Roof Height (ft):	0.2300
Roof Slope (ft/ft):	0.0400
Shell Radius (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0873
Vapor Molecular Weight (lb/lb-mole):	50.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	11.2303
Daily Avg. Liquid Surface Temp. (deg. R):	599.6700
Daily Average Ambient Temp. (deg. F):	51.9625
Ideal Gas Constant R	
(psia-cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	599.6700
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Blusqft-deg):	1.452.1184
Vapor Space Expansion Factor:	0.0000
Vapor Space Expansion Factor:	0.0000
Daily Vapor Temperature Range (deg. R):	0.0000
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	11.2303
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	11.2303
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	11.2303
Daily Avg. Liquid Surface Temp. (deg. R):	599.6700
Daily Min. Liquid Surface Temp. (deg. R):	599.6700
Daily Max. Liquid Surface Temp. (deg. R):	599.6700
Daily Ambient Temp. Range (deg. R):	23.3583
Vented Vapor Saturation Factor:	0.7423
Vented Vapor Saturation Factor:	0.7423
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	11.2303
Vapor Space Outage (ft):	0.5833

Working Losses (lb): 5,264.1982
Vapor Molecular Weight (lb/lb-mole): 50.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia): 11.2303
Annual Net Throughput (gall/yr.): 525,000.0000
Annual Turnovers: 30.0264
Turnover Factor: 1.0000
Maximum Liquid Volume (gal): 16,497.5776
Maximum Liquid Height (ft): 19.5000
Tank Diameter (ft): 12.0000
Working Loss Product Factor: 0.7500

Total Losses (lb): 5,264.1982

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

General AO - Vertical Fixed Roof Tank

Components	Working Loss	Losses(lbs)		Total Emissions
		Breathing Loss		
Crude oil (RVP 5)	5,264.20	0.00		5,264.20

* (4) = 21,056.8 = 10.53 tpy

**TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics**

Identification

User Identification: Methanol Tank
 City:
 State:
 Company:
 Type of Tank: Horizontal Tank
 Description:

Tank Dimensions

Shell Length (ft): 6.00
 Diameter (ft): 4.00
 Volume (gallons): 500.00
 Turnovers: 4.00
 Net Throughput(gal/yr): 2,000.00
 Is Tank Heated (Y/N):
 Is Tank Underground (Y/N): N

Paint Characteristics

Shell Color/Shade: Gray/Light
 Shell Condition: Good

Breather Vent Settings

Vacuum Settings (psig): -0.03
 Pressure Settings (psig): 0.03

Meteorological Data used in Emissions Calculations: Salt Lake City, Utah (Avg Atmospheric Pressure = 12.64 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Methanol Tank - Horizontal Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)		Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.	Avg.	Min.	Max.	Min.	Max.					
Methyl alcohol	All	59.41	49.72	69.11	54.20	54.20	1.4156	1.0351	1.9099	32.0400			32.04	Option 2, A=7.897, B=1474.08, C=229.13

**TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)**

Methanol Tank - Horizontal Tank

Annual Emission Calculations

Standing Losses (lb):	18.2764
Vapor Space Volume (cu ft):	48.0243
Vapor Density (lb/cu ft):	0.0081
Vapor Space Expansion Factor:	0.1473
Vented Vapor Saturation Factor:	0.8695
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	48.0243
Tank Diameter (ft):	4.0000
Effective Diameter (ft):	5.5293
Vapor Space Outage (ft):	2.0000
Tank Shell Length (ft):	6.0000
Vapor Density:	
Vapor Density (lb/cu ft):	0.0081
Vapor Molecular Weight (lb/lb-mole):	32.0400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.4156
Daily Avg. Liquid Surface Temp. (deg. R):	519.0816
Daily Average Ambient Temp. (deg. F):	51.9625
Ideal Gas Constant R (psia cu ft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	513.8725
Tank Paint Solar Absorptance (Shell):	0.5400
Daily Total Solar Insulation Factor (Blusqft day):	1.452.1184
Vapor Space Expansion Factor:	
Vapor Space Expansion Factor:	0.1473
Daily Vapor Temperature Range (deg. R):	38.7740
Daily Vapor Pressure Range (psia):	0.8748
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.4156
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	1.0351
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	1.9099
Daily Avg. Liquid Surface Temp. (deg R):	519.0816
Daily Min. Liquid Surface Temp. (deg R):	509.3881
Daily Max. Liquid Surface Temp. (deg R):	528.7751
Daily Ambient Temp. Range (deg. R):	23.3583
Vented Vapor Saturation Factor:	
Vented Vapor Saturation Factor:	0.8695
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.4156
Vapor Space Outage (ft):	2.0000
Working Losses (lb):	
Vapor Molecular Weight (lb/lb-mole):	2.1598
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	32.0400
Annual Net Throughput (gal/yr.):	1.4156
Annual Turnovers:	2.000.0000
Turnover Factor:	4.0000
	1.0000

Tank Diameter (ft): 4.0000
Working Loss Product Factor: 1.0000

Total Losses (lb): 20,4362

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Methanol Tank - Horizontal Tank

Components	Losses(lbs)		
	Working Loss	Breathing Loss	Total Emissions
Methyl alcohol	2.16	18.28	20.44

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification
 User Identification: Glycol Tank
 City:
 State:
 Company:
 Type of Tank: Horizontal Tank
 Description:

Tank Dimensions
 Shell Length (ft): 6.00
 Diameter (ft): 4.00
 Volume (gallons): 500.00
 Turnovers: 4.00
 Net Throughput(gal/yr): 2,000.00
 Is Tank Heated (Y/n): N
 Is Tank Underground (Y/n): N

Paint Characteristics
 Shell Color/Shade: Gray/Light
 Shell Condition: Good

Breather Vent Settings
 Vacuum Settings (psig): -0.03
 Pressure Settings (psig): 0.03

Meteorological Data used in Emissions Calculations: Salt Lake City, Utah (Avg Atmospheric Pressure = 12.64 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Glycol Tank - Horizontal Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)		Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.	Avg.	Min.	Max.	Min.	Max.					
Propylene glycol	All	59.41	49.72	69.11	54.20	0.0009	0.0005	0.0015	76.1100				76.11	Option 2: A=8.2082, B=2085.9, C=203.54

**TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)**

Glycol Tank - Horizontal Tank

Annual Emission Calculations

Standing Losses (lb): 0.0153
 Vapor Space Volume (cu ft): 48.0243
 Vapor Density (lb/cu ft): 0.0000
 Vapor Space Expansion Factor: 0.0700
 Vented Vapor Saturation Factor: 0.9999

Tank Vapor Space Volume:
 Vapor Space Volume (cu ft): 48.0243
 Tank Diameter (ft): 4.0000
 Effective Diameter (ft): 5.5293
 Vapor Space Outage (ft): 2.0000
 Tank Shell Length (ft): 6.0000

Vapor Density
 Vapor Density (lb/cu ft): 0.0000
 Vapor Molecular Weight (lb/lb-mole): 76.1100
 Vapor Pressure at Daily Average Liquid Surface Temperature (psia): 0.0009
 Daily Avg. Liquid Surface Temp. (deg. R): 519.0816
 Daily Average Ambient Temp. (deg. F): 51.9625
 Ideal Gas Constant R (psia cuft / (lb-mol-deg R)): 10.731
 Liquid Bulk Temperature (deg. R): 513.8725
 Tank Paint Solar Absorptance (Shell): 0.5400
 Daily Total Solar Insulation Factor (Btu/sqft day): 1,452.1184

Vapor Space Expansion Factor
 Vapor Space Expansion Factor: 0.0700
 Daily Vapor Temperature Range (deg. R): 38.7740
 Daily Vapor Pressure Range (psia): 0.0010
 Breather Vent Press. Setting Range(psia): 0.0600
 Vapor Pressure at Daily Average Liquid Surface Temperature (psia): 0.0009
 Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia): 0.0005
 Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia): 0.0015
 Daily Avg. Liquid Surface Temp. (deg R): 519.0816
 Daily Min. Liquid Surface Temp. (deg R): 509.3891
 Daily Max. Liquid Surface Temp. (deg R): 528.7751
 Daily Ambient Temp. Range (deg. R): 23.3583

Vented Vapor Saturation Factor
 Vented Vapor Saturation Factor: 0.9999
 Vapor Pressure at Daily Average Liquid Surface Temperature (psia): 0.0009
 Vapor Space Outage (ft): 2.0000

Working Losses (lb): 0.0033
 Vapor Molecular Weight (lb/lb-mole): 76.1100
 Vapor Pressure at Daily Average Liquid Surface Temperature (psia): 0.0009
 Annual Net Throughput (gal/yr.): 2,000.0000
 Annual Turnovers: 4.0000
 Turnover Factor: 1.0000

Tank Diameter (ft):	4.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	0.0186

**TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals**

Emissions Report for: Annual

Glycol Tank - Horizontal Tank

Components	Losses(lbs)		
	Working Loss	Breathing Loss	Total Emissions
Propylene glycol	0.00	0.02	0.02

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1/29/2014