

Givaudan Flavors

Facility ID: 1050421, Emission Unit: 001

Twelve Month Rolling Total

Month	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	12-Month Rolling Total
Methanol	0.0282	0.1052	0.0652	0.0533	0.0274	0.0753	0.0544	0.07203	0.03885	0.11498	0.06164	0.09317073	0.78964
Acetaldehyde	0.0001	0.0001	0.0001	0.0002	0.0002	0.0001	0.0001	0.00022	0.00009	0.00017	0.00002	0.00014905	0.00151
Ethanol	0.1005	0.0493	0.0544	0.0286	0.0290	0.0467	0.0296	0.03543	0.06229	0.04665	0.08883	0.10471973	0.67604
Oil	0.2111	0.2324	0.1531	0.1163	0.0976	0.1808	0.1775	0.15593	0.24296	0.17511	0.10387	0.132201	1.97876
Total VOC/mon	0.3399	0.3870	0.2729	0.1984	0.1542	0.3027	0.2616	0.26361	0.34419	0.33691	0.25436	0.33024051	3.44595
Total HAP/mon	0.0283	0.1054	0.0654	0.0535	0.0275	0.0753	0.0545	0.07225	0.03894	0.11515	0.06166	0.09331978	0.79115

Allowable: Total HAP = 5.6 TPY (Methanol + Acetaldehyde), Total VOC = 10.8 TPY (MeOH + Acetaldehyde + EtOH + Oil)

Givaudan Flavors

Facility ID: 1050421, Emission Unit: 001

Area	Product	Solvent	bat/month	# MeOH Used	kg MeOH	MeOH evn/kg	g/m ³ /month	em #/month	Cmpg#/month	kg displaced	Emissions for N2 sweep 38.01	Emissions for N2 sweep 38.02
RB	850942	890950	5	7236	146.26	2.19	28	66.84	1	3602.63	19.05	0.2
RB	825040	890920		7236	146.26	2.19	0	0.00		0.00	0	0
RB	840740	890940		7236	146.26	2.19	0	0.00		0.00	0	0
RB	852544	890950		7236	146.26	2.19	0	0.00		0.00	0	0
RB	845027	890970		7236	146.26	2.19	0	0.00		0.00	0	0
RB	841441	890940		7236	146.26	2.19	0	0.00		0.00	0	0
RB	852447	890950		7236	146.26	2.19	0	0.00		0.00	0	0
OD	832447	890950		3289	66.48	0.99	0	0.00		0.00	0	0
OD	845027	890940		3289	66.48	0.99	0	0.00		0.00	0	0
OD	825040	890920	8	3289	66.48	0.99	32	31.60	1	2127.20	30.48	0.32
OD	820740	890920	2	3289	66.48	0.99	8	7.95	1	531.82	7.62	0.08
OD	831040	890930		3289	66.48	0.99	0	0.00		0.00	0	0
OD	841441	890940		3289	66.48	0.99	0	0.00		0.00	0	0
OD	840740	890940		3289	66.48	0.99	0	0.00		0.00	0	0
OD	810740	890910	4	3289	66.48	0.99	16	16.90	1	1063.64	15.24	0.18
OD	810540	890910		3289	66.48	0.99	0	0.00		0.00	0	0
			19			0.00		112.49	4	7525.36	72.39	0.76

Area	Product	Solvent	bat/month	# EIOH Used	kg EIOH	EIOH evn/kg	g/m ³ /month	em #/month	Cmpg#/month	kg displaced	N2 sweep 38.01	N2 sweep 38.02
RB	854542	890950	2	10000	202.12	3.02	11	33.24	1	2223.33		0.12
RB	852047	890950	5	10000	202.12	3.02	28	78.56	1	6255.15		0.03
OD	83040	890930		4350	88.10	1.32	0	0.00		0.00		
OD	852447	890950	1	4350	88.10	1.32	3	3.95	1	284.31		
OD	845040	890940		4350	88.10	1.32	0	0.00		0.00		
			8					116.74		7742.80		0.042

Total MeOH emissions from transfers = 112.49
 Total EIOH emissions from transfers = 116.74

Distillation Unit	bat/month vacuum distillation oil	bat/month vacuum distillation MeOH	bat/month vacuum distillation EIOH	Vacuum Dist. Oil Emission Factor lbs/out	Vacuum Dist. MeOH Emission Factor	Vacuum Dist. EIOH Emission Factor	d-Limonene emissions bat/month	MeOH Emissions bat/month	EIOH Emissions bat/month
A-Still	21						0.21		
B-Still	23			0.04			0.92		
C-Still	21			0.06			0.25		
D-Still	10			0.06			0.60		
V-Still	6			0.003			0.02		
W-Still									
X-Still									
Y-Still			1	0.008	0.05	0.006	0.00	0.00	0.01
Z-Still	14			0.006	0.05	0.006	0.00	0.70	0.00
Robatel 11.01					0.32	0.12		0.00	0.00
C-0004			2		0.32	0.12		0.00	0.24
C-0005					0.32	0.12		0.00	0.00
							3.21	0.70	0.25

Aroma ton	# of Aroma/month	All water phase
Cl, CX, UJ	792,758.76	
RR	1,028,048.09	
PR, PX, PZ, IK	563,149.05	
U & B	615,852.41	Only for Tank Truck loading and unloading
Total #s		
Transferred	290918.32	
Gallons ton	355492.44	Average density is 15% EIOH in aroma & 16 lbs/gal
kg displaced	47522.23	
Assume mean temp	305 K	
Partial Pressure	13 mmHg	Assume mean concentration of EIOH in Aroma is 15%
Molecular Weight	46.07 # mol	
R (constant)	999	
VOC Emissions from Aroma	93.41	

Oil	# of Oil/Month	All transisitions
Cl, CX, UJ	2,403,882.37	3196950.485
RR	1,382,127.80	2411176.986
PR, PX, PZ, IK	1,252,714.02	1816940.871
U & B	1,077,940.00	
Total #s		
Transferred	6116784.29	
Gallons ton	873823.47	
kg displaced	116812.72	
Assume mean temp	305 K	
Partial Pressure	5 mmHg	
Molecular Weight	135.25 # mol	
R (constant)	999	
VOC Emissions from Oil	281.19	

An Emission Calculation check based on gas laws for displacement losses during MeOH charges in an effort to verify the accuracy of the magnitude of MeOH and EIOH losses to the stack.
 Assumptions made:
 1. Temperature of MeOH is 305 K
 2. Pressure of MeOH is 5 mmHg
 3. Density of MeOH is 790 kg/m³
 4. Molecular weight of MeOH is 32 g/mol
 5. Gas constant R is 8.314 J/mol.K
 6. Displacement loss is calculated as: $V_{displaced} = \frac{P_{MeOH} \cdot V_{MeOH}}{P_{atm} - P_{MeOH}}$
 7. Emission factor is calculated as: $E_{MeOH} = \frac{V_{displaced} \cdot \rho_{MeOH}}{V_{oil}}$
 8. Emission factor is calculated as: $E_{EIOH} = \frac{V_{displaced} \cdot \rho_{EIOH}}{V_{oil}}$

AA	# of AA/Month
Cl, CX, UJ	149.35
RR	
PR, PX, PZ, IK	77.80
U & B	
Total #s	
Transferred	227.15
Gallons ton	34.84
kg displaced	4.66
Assume mean temp	277.4 K
Partial Pressure	402.68 mmHg
Molecular Weight	44.05 # mol
R (constant)	999
HAP Emissions from AA	0.30

#/month	tons/month
Methanol	186.34
Acetaldehyde	0.30
Ethanol	209.44
Oil	281.40
Total VOC/month	687.48
Total HAP/month	196.84

ANNUAL AIR EMISSION SUMMARY 2008

Givaudan Flavors
Facility ID: 1056421, Emission Unit: 001

All Quantities in TONS

DATE	Methanol		Acetaldehyde		Ethanol		d-Limonene		Total HAP		Total VOC	
	tons/mo	tons/yr	tons/mo	tons/yr	tons/mo	tons/yr	tons/mo	tons/yr	tons/mo	tons/yr	tons/mo	tons/yr
1/2008-1/2008	1.931	0.007	0.753	1.561	1.561	1.561	1.561	1.561	1.561	3.981	3.981	
2/2008-2/2008	1.947	0.007	0.749	1.537	1.537	1.537	1.537	1.537	1.537	3.974	3.974	
3/2008-3/2008	1.726	0.006	0.722	1.505	1.442	1.442	1.442	1.442	1.442	3.655	3.655	
4/2008-4/2008	1.415	0.005	0.610	1.262	1.262	1.262	1.262	1.262	1.262	3.187	3.187	
5/2008-5/2008	1.488	0.005	0.616	1.262	1.262	1.262	1.262	1.262	1.262	3.187	3.187	
6/2008-6/2008	1.488	0.005	0.616	1.262	1.262	1.262	1.262	1.262	1.262	3.187	3.187	
7/2008-7/2008	1.488	0.005	0.616	1.262	1.262	1.262	1.262	1.262	1.262	3.187	3.187	
8/2008-8/2008	1.488	0.005	0.616	1.262	1.262	1.262	1.262	1.262	1.262	3.187	3.187	
9/2008-9/2008	1.488	0.005	0.616	1.262	1.262	1.262	1.262	1.262	1.262	3.187	3.187	
10/2008-10/2008	1.488	0.005	0.616	1.262	1.262	1.262	1.262	1.262	1.262	3.187	3.187	
11/2008-11/2008	1.488	0.005	0.616	1.262	1.262	1.262	1.262	1.262	1.262	3.187	3.187	
12/2008-12/2008	1.488	0.005	0.616	1.262	1.262	1.262	1.262	1.262	1.262	3.187	3.187	
ROLLING TOTAL												
	Methanol	Acetaldehyd	Ethanol	d-Limonene	Total HAP	Total VOC						
	1.931	0.007	0.753	1.561	1.561	1.561	1.561	1.561	1.561	3.981	3.981	

All Quantities in TONS

DATE	Methanol		Acetaldehyde		Ethanol		d-Limonene		Total HAP		Total VOC	
	tons/mo	tons/yr	tons/mo	tons/yr	tons/mo	tons/yr	tons/mo	tons/yr	tons/mo	tons/yr	tons/mo	tons/yr
1/2007-1/2007	0.2817	0.002	0.0326	0.2157	0.2817	0.2817	0.2817	0.2817	0.2817	0.7034	0.7034	
2/2007-2/2007	0.1482	0.001	0.0163	0.1078	0.1482	0.1482	0.1482	0.1482	0.1482	0.3517	0.3517	
3/2007-3/2007	0.1482	0.001	0.0163	0.1078	0.1482	0.1482	0.1482	0.1482	0.1482	0.3517	0.3517	
4/2007-4/2007	0.1482	0.001	0.0163	0.1078	0.1482	0.1482	0.1482	0.1482	0.1482	0.3517	0.3517	
5/2007-5/2007	0.1482	0.001	0.0163	0.1078	0.1482	0.1482	0.1482	0.1482	0.1482	0.3517	0.3517	
6/2007-6/2007	0.1482	0.001	0.0163	0.1078	0.1482	0.1482	0.1482	0.1482	0.1482	0.3517	0.3517	
7/2007-7/2007	0.1482	0.001	0.0163	0.1078	0.1482	0.1482	0.1482	0.1482	0.1482	0.3517	0.3517	
8/2007-8/2007	0.1482	0.001	0.0163	0.1078	0.1482	0.1482	0.1482	0.1482	0.1482	0.3517	0.3517	
9/2007-9/2007	0.1482	0.001	0.0163	0.1078	0.1482	0.1482	0.1482	0.1482	0.1482	0.3517	0.3517	
10/2007-10/2007	0.1482	0.001	0.0163	0.1078	0.1482	0.1482	0.1482	0.1482	0.1482	0.3517	0.3517	
11/2007-11/2007	0.1482	0.001	0.0163	0.1078	0.1482	0.1482	0.1482	0.1482	0.1482	0.3517	0.3517	
12/2007-12/2007	0.1482	0.001	0.0163	0.1078	0.1482	0.1482	0.1482	0.1482	0.1482	0.3517	0.3517	
ROLLING TOTAL												
	Methanol	Acetaldehyd	Ethanol	d-Limonene	Total HAP	Total VOC						
	0.2817	0.002	0.0326	0.2157	0.2817	0.2817	0.2817	0.2817	0.2817	0.7034	0.7034	

All Quantities in TONS

DATE	Methanol		Acetaldehyde		Ethanol		d-Limonene		Total HAP		Total VOC	
	tons/mo	tons/yr	tons/mo	tons/yr	tons/mo	tons/yr	tons/mo	tons/yr	tons/mo	tons/yr	tons/mo	tons/yr
1/2006-1/2006	0.09	0.003	0.0318	0.21	0.09	0.09	0.09	0.09	0.09	0.33	0.33	
2/2006-2/2006	0.17	0.003	0.0732	0.24	0.17	0.17	0.17	0.17	0.17	0.44	0.44	
3/2006-3/2006	0.18	0.003	0.0592	0.18	0.18	0.18	0.18	0.18	0.18	0.44	0.44	
4/2006-4/2006	0.11	0.002	0.0382	0.11	0.11	0.11	0.11	0.11	0.11	0.35	0.35	
5/2006-5/2006	0.11	0.002	0.0382	0.11	0.11	0.11	0.11	0.11	0.11	0.35	0.35	
6/2006-6/2006	0.11	0.002	0.0382	0.11	0.11	0.11	0.11	0.11	0.11	0.35	0.35	
7/2006-7/2006	0.11	0.002	0.0382	0.11	0.11	0.11	0.11	0.11	0.11	0.35	0.35	
8/2006-8/2006	0.11	0.002	0.0382	0.11	0.11	0.11	0.11	0.11	0.11	0.35	0.35	
9/2006-9/2006	0.11	0.002	0.0382	0.11	0.11	0.11	0.11	0.11	0.11	0.35	0.35	
10/2006-10/2006	0.11	0.002	0.0382	0.11	0.11	0.11	0.11	0.11	0.11	0.35	0.35	
11/2006-11/2006	0.11	0.002	0.0382	0.11	0.11	0.11	0.11	0.11	0.11	0.35	0.35	
12/2006-12/2006	0.11	0.002	0.0382	0.11	0.11	0.11	0.11	0.11	0.11	0.35	0.35	
ROLLING TOTAL												
	Methanol	Acetaldehyd	Ethanol	d-Limonene	Total HAP	Total VOC						
	0.09	0.003	0.0318	0.21	0.09	0.09	0.09	0.09	0.09	0.33	0.33	

All Quantities in TONS

DATE	Methanol		Acetaldehyde		Ethanol		d-Limonene		Total HAP		Total VOC	
	tons/mo	tons/yr	tons/mo	tons/yr	tons/mo	tons/yr	tons/mo	tons/yr	tons/mo	tons/yr	tons/mo	tons/yr
1/2005-1/2005	0.119655	0.001	0.0001	0.0001	0.119655	0.119655	0.119655	0.119655	0.119655	0.358965	0.358965	
2/2005-2/2005	0.119655	0.001	0.0001	0.0001	0.119655	0.119655	0.119655	0.119655	0.119655	0.358965	0.358965	
3/2005-3/2005	0.119655	0.001	0.0001	0.0001	0.119655	0.119655	0.119655	0.119655	0.119655	0.358965	0.358965	
4/2005-4/2005	0.119655	0.001	0.0001	0.0001	0.119655	0.119655	0.119655	0.119655	0.119655	0.358965	0.358965	
5/2005-5/2005	0.119655	0.001	0.0001	0.0001	0.119655	0.119655	0.119655	0.119655	0.119655	0.358965	0.358965	
6/2005-6/2005	0.119655	0.001	0.0001	0.0001	0.119655	0.119655	0.119655	0.119655	0.119655	0.358965	0.358965	
7/2005-7/2005	0.119655	0.001	0.0001	0.0001	0.119655	0.119655	0.119655	0.119655	0.119655	0.358965	0.358965	
8/2005-8/2005	0.119655	0.001	0.0001	0.0001	0.119655	0.119655	0.119655	0.119655	0.119655	0.358965	0.358965	
9/2005-9/2005	0.119655	0.001	0.0001	0.0001	0.119655	0.119655	0.119655	0.119655	0.119655	0.358965	0.358965	
10/2005-10/2005	0.119655	0.001	0.0001	0.0001	0.119655	0.119655	0.119655	0.119655	0.119655	0.358965	0.358965	
11/2005-11/2005	0.119655	0.001	0.0001	0.0001	0.119655	0.119655	0.119655	0.119655	0.119655	0.358965	0.358965	
12/2005-12/2005	0.119655	0.001	0.0001	0.0001	0.119655	0.119655	0.119655	0.119655	0.119655	0.358965	0.358965	
ROLLING TOTAL												
	Methanol	Acetaldehyd	Ethanol	d-Limonene	Total HAP	Total VOC						
	0.119655	0.001	0.0001	0.0001	0.119655	0.119655	0.119655	0.119655	0.119655	0.358965	0.358965	

ALLOWABLE
5.5 TPY
10.8 TPY

Methanol	Acetaldehyde	Ethanol	d-Limonene	Total HAP	Total VOC
0.28171784	0.1728159	0.2109652	0.1734887	0.187128	0.187128
0.00016188	0.0001447	0.0001815	0.0003962	0.0003962	0.0003962
0.11638615	0.0810858	0.1002485	0.091886	0.091886	0.091886
0.2351544	0.2008808	0.1808344	0.2328518	0.2328518	0.2328518
0.45891812	0.4008808	0.4638888	0.45891812	0.45891812	0.45891812
0.68268176	0.6017616	0.6457776	0.68268176	0.68268176	0.68268176
0.90644544	0.8026432	0.8496832	0.90644544	0.90644544	0.90644544
1.13020912	1.0035216	1.0566272	1.13020912	1.13020912	1.13020912
1.3539728	1.2044000	1.2696704	1.3539728	1.3539728	1.3539728
1.57773664	1.4052784	1.4808192	1.57773664	1.57773664	1.57773664
1.80150048	1.6061568	1.6919680	1.80150048	1.80150048	1.80150048
2.02526432	1.8070352	1.9031168	2.02526432	2.02526432	2.02526432
2.24902816	2.0079136	2.1142656	2.24902816	2.24902816	2.24902816
2.47279200	2.2087920	2.3254144	2.47279200	2.47279200	2.47279200
2.69655584	2.4096704	2.5365632	2.69655584	2.69655584	2.69655584
2.92031968	2.6105488	2.7477120	2.92031968	2.92031968	2.92031968
3.14408352	2.8114272	2.9588608	3.14408352	3.14408352	3.14408352
3.36784736	3.0123056	3.1700096	3.36784736	3.36784736	3.36784736
3.59161120	3.2131840	3.3811584	3.59161120	3.59161120	3.59161120
3.81537504	3.4140624	3.5923072	3.81537504	3.81537	