

N02 - LANDFILL GAS DEFAULT COMPOSITION (NO CO-DISPOSAL)

CALCULATION METHODS

VOC Fugitive Emissions:

Landfill Gas Collection Efficiency (E) = Amount of Gas Collected
Gc/Total Amount of Gas Generated Gt
Gr = Gt - Gc
Gr = Gt - Gc = (Gc/E) - Gc
Ea = Gr x Ci x MWi / (10⁶ * R)
Eh = Ea / (days/year x hours/day)

Where:

Ea = Annual emissions of each contaminant (i), (lbs/yr)
Eh = Maximum hourly emissions of each contaminant, (lbs/hr)
E = Collection efficiency of landfill gas collection system.
Gc: Landfill gas collected by the collection system and routed to landfill disposal site (SCFH or SCFD or SCFY), (ft³/yr)
Gt: Total landfill gas generated (SCFH or SCFD or SCFY), (ft³/yr)
Gr: Landfill gas released through the landfill surface (SCFH or SCFD or SCFY), (ft³/yr)
Ci = Concentration of each listed substance (i) in the landfill gas, (ppmv)
MWi = Molecular weight of each listed substance (i) in the landfill gas, (lbs/lbmole)
R = Gas Constant: 0.7303 atm*ft³/Lbmol*R
@ 1 atm, Temp (68F = 527.67R)
R = 0.7303 (atm*ft³/Lbmol*R) / 1 (atm) x 527.67 (R)
R = 385.36 ≈ 385 (ft³/Lbmol)

PM Fugitive Emissions :

Ea = Ua x EF x Ci / 10⁶
Eh = Ud x EF x Ci / (H x 10⁶)

Where:

Ea = Annual emissions of each contaminant, (lbs/yr)
Eh = Maximum hourly emissions of each contaminant, (lbs/hr)
Ua = Annual amount of cover material used, (tons/yr)
Ud = Annual daily amount of cover material used, (tons/day)
H = Hours of operation, (hours/day)
EF = Particulate emission factor for cover application operations, (lbs/ton)
= 0.05 lbs TSP/ton
= 0.021 lbs PM10/ton
Ci = Concentration of each listed toxic substance (i) in process dust, (ppmv)

Notes:

- Control efficiencies must be included in emission factors since the calculation procedure will not refer to this data.
- The TOG factor is based on an average 40% methane content in the raw gas and an assumed 99.9% DRE.
- The ROG factor is based on the EPA AP-42 assumption of 595 ppmv NMHC as hexane in the raw gas.
- Individual pollutant factors are estimated using AP-42 raw gas speciation (9/97) .

POLLUTANT	DISTRICT EMISSION FACTORS (ppmv or ppmw)	EPA REFERENCE DOCUMENT	EPA-FACTOR	(UNITS)	COMMENTS
NOX					
CO	141.00	AP-42, Sect.2.4, 9/97, Table 2.4-1	141.00	ppmv	
SOX					
TOG	400000.00				ASSUMES 40% AVERAGE METHANE CONTENT OF LANFILL GAS.
ROG	595.00	AP-42, Sect.2.4, 9/97, Table 2.4-2	595.00	ppmv as hexane	
TSP	1000000.00			ppmw	ASSUME ALL PARTICULATE EMISSIONS ARE PM10 AND TSP.

POLLUTANT	DISTRICT EMISSION FACTORS (ppmv or ppmw)	EPA REFERENCE DOCUMENT	EPA-FACTOR	(UNITS)	COMMENTS
PM10	1000000.00			ppmw	ASSUME ALL PARTICULATE EMISSIONS ARE PM10 AND TSP.
ACETONE	7.01	AP-42, Sect.2.4, 9/97, Table 2.4-1	7.01	ppmv	
ACRYLONITRILE	6.33	AP-42, Sect.2.4, 9/97, Table 2.4-1	6.33	ppmv	
ARSENIC	20.00	APCD Local haul road sample results	20.00	ppmw	
BENZENE	1.91	AP-42, Sect.2.4, 9/97, Table 2.4-1	1.91	ppmv	
BERYLLIUM	1.00	APCD Local haul road sample results			
CADMIUM	1.00	APCD Local haul road sample results			
CARBON DISULFIDE	0.58	APCD Local haul road sample results			
CARBONYL SULFIDE	0.49	APCD Local haul road sample results			
CHLOROBENZENE	0.25	AP-42, Sect.2.4, 9/97, Table 2.4-1	0.25	ppmv	
CHLOROFORM	0.03	AP-42, Sect.2.4, 9/97, Table 2.4-1	0.03	ppmv	
CHLORODIFLUOROMETHANE	1.30	AP-42, Sect.2.4, 9/97, Table 2.4-1	1.30	ppmv	
CHROMIUM (hexavalent)					All haul road samples were non-detect for Cr ⁺⁶ , assume 0 ppmw.
CHROMIUM (Total)	50.00	APCD Local haul road sample results			
COPPER	100.00	APCD Local haul road sample results			
DIMETHYL SULFIDE	7.82	AP-42, Sect.2.4, 9/97, Table 2.4-1	7.82	ppmv	
ETHYL BENZENE	4.61	AP-42, Sect.2.4, 9/97, Table 2.4-1	4.61	ppmv	
ETHYLENE DIBROMIDE					NO VALUE REPORTED IN THE REVISED AP-42 (9/97).
ETHYLENE DICHLORIDE	0.41	AP-42, Sect.2.4, 9/97, Table 2.4-1	0.41	ppmv	
HEXANE	6.57	AP-42, Sect.2.4, 9/97, Table 2.4-1	6.57	ppmv	
HYDROGEN SULFIDE	35.50	AP-42, Sect.2.4, 9/97, Table 2.4-1	35.50	ppmv	
LEAD	50.00	APCD Local haul road sample results			
MANGANESE	500.00	APCD Local haul road sample results			

POLLUTANT	DISTRICT EMISSION FACTORS (ppmv or ppmw)	EPA REFERENCE DOCUMENT	EPA-FACTOR	(UNITS)	COMMENTS
MERCURY	5.00	APCD Local haul road sample results			
METHYLENE CHLORIDE	14.30	AP-42, Sect.2.4, 9/97, Table 2.4-1	14.3	ppmv	
METHYL ISOBUTYL KETONE	1.87	AP-42, Sect.2.4, 9/97, Table 2.4-1	1.87	ppmv	
METHYL ETHYL KETONE	7.09	AP-42, Sect.2.4, 9/97, Table 2.4-1	7.09	ppmv	
NICKEL	20.00	APCD Local haul road sample results			
PERCHLOROETHYLENE	3.73	AP-42, Sect.2.4, 9/97, Table 2.4-1	3.73	ppmv	
SELENIUM	5.00	APCD Local haul road sample results			
SILICA (crystalline)	100000.00	APCD Local haul road sample results			
RESPIRABLE SILICA, CRYSTALLINE CRISTOBALITE QUARTZ	7950.00				PM4 fraction of PM10 silica, assumed to be 7.95%
TOLUENE	39.30	AP-42, Sect.2.4, 9/97, Table 2.4-1	39.30	ppmv	
1,1,1-TRICHLOROETHANE	0.48	AP-42, Sect.2.4, 9/97, Table 2.4-1	0.48	ppmv	
TRICHLOROETHYLENE	2.82	AP-42, Sect.2.4, 9/97, Table 2.4-1	2.82	ppmv	
VINYL CHLORIDE	7.34	AP-42, Sect.2.4, 9/97, Table 2.4-1	7.34	ppmv	
VINYLDENE CHLORIDE	0.20	AP-42, Sect.2.4, 9/97, Table 2.4-1	0.20	ppmv	
XYLENES	12.10	AP-42, Sect.2.4, 9/97, Table 2.4-1	12.10	ppmv	
ZINC	200.00	APCD Local haul road sample results			

Last Updated on Dec. 2023 By J. Lofgren