

**Renewable Biomass Group
Potential Emission Calculations**

Table C-15. RTO Burners Potential Criteria and HAP Pollutant Emissions

Pollutant	Uncontrolled Emission Factor ¹ (lb/MMscf)	Control Efficiency ²	Potential Emissions ³	
			(lb/hr)	(tpy)
CO ⁴	84	50%	--	--
NO _x ⁴	100	--	--	--
Filterable PM ⁴	1.90	--	--	--
Condensable PM	5.70	--	0.18	0.78
Total PM	7.60	--	0.24	1.04
Total PM ₁₀ ⁵	7.60	--	0.24	1.04
Total PM _{2.5} ⁵	7.60	--	0.24	1.04
SO ₂ ⁴	0.6	--	--	--
VOC ⁴	5.5	95%	--	--
Lead	5.00E-04	--	1.57E-05	6.87E-05
CH ₄	2.3	--	0.07	0.32
N ₂ O	2.2	--	0.07	0.30
CO ₂	120,000	--	3,765	16,489
CO ₂ e ⁶	120,713	--	3,787	16,587
HAP Emissions				
Arsenic Compounds	2.00E-04	--	6.27E-06	2.75E-05
Benzene	2.10E-03	95%	3.29E-06	1.44E-05
Beryllium Compounds	1.21E-05	--	3.80E-07	1.66E-06
Cadmium	1.10E-03	--	3.45E-05	1.51E-04
Chromium Compounds	1.40E-03	--	4.39E-05	1.92E-04
Cobalt Compounds(CoC)	8.40E-05	--	2.64E-06	1.15E-05
Formaldehyde	7.50E-02	95%	1.18E-04	5.15E-04
Hexane	1.80E+00	95%	0.00	0.01
Lead	5.00E-04	--	1.57E-05	6.87E-05
Manganese	3.80E-04	--	1.19E-05	5.22E-05
Mercury	2.60E-04	--	8.16E-06	3.57E-05
Naphthalene	6.10E-04	95%	9.57E-07	4.19E-06
Nickel Compounds	2.10E-03	--	6.59E-05	2.89E-04
Selenium Compounds	2.40E-05	--	7.53E-07	3.30E-06
Toluene(Methylbenzene)	3.40E-03	95%	5.33E-06	2.34E-05
<i>Polycyclic Organic Matter (POM) *</i>				
<i>Polycyclic Aromatic Compounds (PAC)**</i>				
2-Methylnaphthalene*	2.40E-05	95%	3.76E-08	1.65E-07
3-Methylchloranthrene**	1.80E-06	95%	2.82E-09	1.24E-08
7,12-Dimethylbenzo(a)anthracene**	1.60E-05	95%	2.51E-08	1.10E-07
Acenaphthene*	1.80E-06	95%	2.82E-09	1.24E-08
Acenaphthylene*	1.80E-06	95%	2.82E-09	1.24E-08
Anthracene*	2.40E-06	95%	3.76E-09	1.65E-08
Benzo(a)anthracene**	1.80E-06	95%	2.82E-09	1.24E-08
Benzo(a)pyrene**	1.20E-06	95%	1.88E-09	8.24E-09
Benzo(b)fluoranthene**	1.80E-06	95%	2.82E-09	1.24E-08
Benzo(k)fluoranthene**	1.80E-06	95%	2.82E-09	1.24E-08
Benzo(g,h,i)perylene*	1.20E-06	95%	1.88E-09	8.24E-09
Chrysene(Benzo(a)phenanthrene)**	1.80E-06	95%	2.82E-09	1.24E-08
Dibenzo(a,h)anthracene**	1.20E-06	95%	1.88E-09	8.24E-09
Fluoranthene*	3.00E-06	95%	4.71E-09	2.06E-08
Fluorene*	2.80E-06	95%	4.39E-09	1.92E-08
Indeno(1,2,3-cd)pyrene**	1.80E-06	95%	2.82E-09	1.24E-08
Phenanthrene*	1.70E-05	95%	2.67E-08	1.17E-07
Pyrene*	5.00E-06	95%	7.84E-09	3.44E-08
Total HAP				0.01

- Uncontrolled emission factors for natural gas combustion from AP-42, Section 1.4 - Natural Gas Combustion, Table 1.4-1,3 (9/03).
- The RTO is assumed to control VOC and Organic HAP with 95% efficiency, and is assumed to control CO with 50% efficiency.
- Potential emissions are calculated as follows:
 Potential Emissions (lb/hr) = [Natural Gas Combustion EF (lb/MMBtu) * Heat Input Capacity (MMBtu/hr)] * (1 - Control efficiency (%))
 Potential Emissions (tpy) = Hourly emissions (lb/hr) * Operation (hr/yr) / 2,000 (lb/ton)
- Emissions for these pollutants are included with the dryer emissions, as the manufacturer guarantee is for emissions exiting the RTO stack.
- Emission factors for Total PM₁₀ and Total PM_{2.5} are the sum of the filterable and condensable components. It is conservatively assumed that filterable PM = filterable PM₁₀ = filterable PM_{2.5}.
- CO₂e is calculated using Global Warming Potentials (GWPs) from 40 CFR Part 98, Subpart A, Table A-1 effective January 1, 2014. GWPs used for CO₂, CH₄, and N₂O are listed below.

CO ₂	1
CH ₄	25
N ₂ O	298