Table 3.1-1 (Metric Units). EMISSION FACTORS FOR LARGE UNCONTROLLED GAS TURBINES[a]

Pollutant	EMISSION FACTOR RATING[b]	Natural Gas (SCC 2-01-002-01)		Fuel Oil (Distillate) (SCC 2-01-001-01)	
		g/kW-hr[c] (power output)	ng/J (fuel input)	g/kW-hr[c] (power output)	ng/J (fuel input)
NO_x	C	2.15	190	3.41	300
CO	D	0.52	46	0.233	20.6
CO_2[d]	B	546	48,160	799	70,520
TOC (as methane)	D	0.117	10.32	0.083	7.31
SO_x (as SO_2)[e]	B	4.57S	404S	4.92S	434.3S
PM-10					
Solids	E	0.094	8.30	0.185	16.3
Condensables	E	0.11	9.72	0.113	9.89
Sizing %					
<0.05 μm	D	15%	15%	16%	16%
<0.10 μm	D	40%	40%	48%	48%
<0.15 μm	D	63%	63%	72%	72%
<0.20 μm	D	78%	78%	85%	85%
<0.25 μm	D	89%	89%	93%	93%
<1 μm	D	100%	100%	100%	100%

[a] References 1-8. SCC = Source Classification Code. PM-10 = particulate matter less than or equal to 10 micrometers (μm) aerodynamic diameter, and sizing % is expressed in μm.

[b] Ratings reflect limited data and/or a lack of documentation of test results, may not apply to specific facilities or populations, and should be used with care.

[c] Calculated from ng/J assuming an average heat rate of 11,318 kJ/kW-hr.

[d] Based on 100% conversion of the fuel carbon to CO_2. CO_2 [ng/J] = 3.67*C/E, where C = carbon content of the fuel by weight (0.75), and E = energy content of fuel, 55.6 kJ/g. The uncontrolled CO_2 emission factors are also applicable to controlled gas turbines.

[e] All sulfur in the fuel is assumed to be converted to SO_2. S = % sulfur in fuel.

Table 3.1-2 (English Units). EMISSION FACTORS FOR LARGE UNCONTROLLED GAS TURBINES[a]

Pollutant	EMISSION FACTOR RATING[b]	Natural Gas (SCC 2-01-002-01)		Fuel Oil (Distillate) (SCC 2-01-001-01)	
		lb/hp-hr[c] (power output)	lb/MMBtu (fuel input)	lb/hp-hr[c] (power output)	lb/MMBtu (fuel input)
NO_x	C	3.53 E-03	0.44	5.60 E-03	0.698
CO	D	8.60 E-04	0.11	3.84 E-04	0.048
CO_2[d]	B	0.897	112	1.31	164
TOC (as methane)	D	1.92 E-04	0.024	1.37 E-04	0.017
SO_x (as SO_2)[e]	B	7.52 E-03S	0.94S	8.09 E-03S	1.01S
PM-10					
Solids	E	1.54 E-04	0.0193	3.04 E-04	0.038
Condensables	E	1.81 E-04	0.0226	1.85 E-04	0.023
Sizing %					
<0.05 μm	D	15%	15%	16%	16%
<0.10 μm	D	40%	40%	48%	48%
<0.15 μm	D	63%	63%	72%	72%
<0.20 μm	D	78%	78%	85%	85%
<0.25 μm	D	89%	89%	93%	93%
<1 μm	D	100%	100%	100%	100%

[a] References 1-8. SCC = Source Classification Code. PM-10 = particulate matter less than or equal to 10 μm aerodynamic diameter, and sizing % is expressed in μm. Condensables are also PM-10 and all PM from oil and gas fired turbines is less than 1 μm in size and therefore are considered PM-10.

[b] Ratings reflect limited data and/or a lack of documentation of test results, may not apply to specific facilities or populations, and should be used with care.

[c] Calculated from lb/MMBtu assuming an average heat rate of 8,000 Btu/hp-hr.

[d] Based on 100% conversion of the fuel carbon to CO_2. CO_2 [lb/MMBtu] = 3.67*C/E, where C = carbon content of fuel by weight (0.75), and E = energy content of fuel, (0.0239 MMBtu/lb). The uncontrolled CO_2 emission factors are also applicable to controlled gas turbines.

[e] All sulfur in the fuel is assumed to be converted to SO_2. S = % sulfur in fuel. When sulfur content is not available, 0.6 lb/10^6 ft^3 (0.0006 lb/MMBtu) can be used; however, the equation is more accurate.

Table 3.1-3 (Metric Units). EMISSION FACTORS FOR LARGE GAS-FIRED CONTROLLED GAS TURBINES[a]

EMISSION FACTOR RATING: C

Pollutant	Water Injection (0.8 water/fuel ratio)		Steam Injection (1.2 water/fuel ratio)		Selective Catalytic Reduction (with water injection)
	g/kW-hr (power output)	ng/J (fuel input)	g/kW-hr (power output)	ng/J (fuel input)	ng/J (fuel input)
NO_x	0.66	61	0.59	52	3.78[b]
CO	1.3	120	0.71	69	3.61
TOC (as methane)	ND	ND	ND	ND	6.02
NH_3	ND	ND	ND	ND	2.80
NMHC	ND	ND	ND	ND	1.38
Formaldehyde[c]	ND	ND	ND	ND	1.16

[a] References 3,10-15. Source Classification Code 2-01-002-01. All data are averages of a limited number of tests and may not be typical of those reductions that can be achieved at a specific location. NMHC = nonmethane hydrocarbons. ND = no data.

[b] An SCR catalyst reduces NO_x by an average of 78%.

[c] Hazardous air pollutant listed in the *Clean Air Act*.

Table 3.1-4 (English Units). EMISSION FACTORS FOR LARGE GAS-FIRED CONTROLLED GAS TURBINES[a]

EMISSION FACTOR RATING: C

Pollutant	Water Injection (0.8 water/fuel ratio)		Steam Injection (1.2 water/fuel ratio)		Selective Catalytic Reduction (with water injection)
	lb/hp-hr (power output)	lb/MMBtu (fuel input)	lb/hp-hr (power output)	lb/MMBtu (fuel input)	lb/MMBtu (fuel input)
NO_x	1.10 E-03	0.14	9.70 E-04	0.12	0.03[b]
CO	2.07 E-03	0.28	1.17 E-03	0.16	0.0084
TOC (as methane)	ND	ND	ND	ND	0.014
NH_3	ND	ND	ND	ND	0.0065
NMHC	ND	ND	ND	ND	0.0032
Formaldehyde[c]	ND	ND	ND	ND	0.0027

[a] References 3,10-15. Source Classification Code 2-01-002-01. All data are averages of a limited number of tests and may not be typical of those reductions that can be achieved at a specific location. NMHC = nonmethane hydrocarbons. ND = no data.

[b] An SCR catalyst reduces NO_x by an average of 78%.

[c] Hazardous air pollutant listed in the *Clean Air Act*.