



## Default Combustion Emission Factors

Revised January 2022

### Criteria Pollutant Emission Factors

#### External Combustion Equipment (for all sizes)

Fuel Type (fuel unit)	Organic Gases (lb/unit)	Nitrogen Oxides (lb/unit)	Sulfur Oxides (lb/unit)	Carbon Monoxide (lb/unit)	Particulate Matter (lb/unit)
Natural Gas (mmscf) / Boilers Only	5.50	100.00	0.60	84.00	7.60
Natural Gas (mmscf) / Other Equipment	7.00	130.00	0.60	35.00	7.50
LPG, Propane, Butane (1000 gal.)	0.26	12.80	4.60	3.20	0.28
Diesel/Distillate Oil (1000 gal.)	1.32	20.00	0.21	5.00	2.00

#### Internal Combustion Engines (ICE) (for all sizes)

Fuel Type (fuel unit) / Engine Type	Organic Gases (lb/unit)	Nitrogen Oxides (lb/unit)	Sulfur Oxides (lb/unit)	Carbon Monoxide (lb/unit)	Particulate Matter (lb/unit)
Natural Gas (mmscf) / 2 Stroke (Lean-Burn) ICE	122.00	3,233.00	0.60	394.00	39.00
Natural Gas (mmscf) / 4 Stroke (Lean-Burn) ICE*	120.00	4,162.00	0.60	323.00	10.00
Natural Gas (mmscf) / 4 Stroke (Rich-Burn) ICE	30.00	2,254.00	0.60	3,794.00	10.00
Natural Gas (mmscf) / Micro Turbine	77.7	54.4	0.6	466.00	6.73
LPG, Propane, Butane (1000 gal.) / All ICEs & Micro Turbine	83.00	139.00	0.35	129.00	5.00
Diesel/Distillate Oil (1000 gal.) / All ICEs & Micro Turbine	37.5	469.00	0.21	102.00	33.50
Gasoline (1000 gal.) / All ICEs & Micro Turbine	206.00	102.00	5.30	3,940.0	6.50

\* If engine specification is not available, assume 4 Stroke (Lean-Burn) ICE.

## **Toxic Air Contaminant (TAC) Emission Factors**

The TAC emissions required to be annually reported and their annual emissions thresholds are presented in Rule 301 Table IV (see below). Default combustion emission factors, and additional TAC emissions required to be reported for AB2588 and criteria pollutant facilities defined by ARB's Regulation for the Reporting of Criteria Air Pollutants and Toxic Air Contaminants (CTR) can be found in Appendix B of the [AB 2588 Quadrennial Air Toxics Emissions Inventory Reporting Procedures, June 2020](#).

The default TAC combustion emission factors from the AB2588 Quadrennial Air Toxics Emissions Inventory Reporting Procedures, June 2020 are pre-populated in the AER web tool. Turbine emission factors are used as surrogates for natural gas, LPG, propane, and butane microturbines.

**Rule 301 - Table IV**

CAS No.	Toxic Air Contaminants	Annual Emission Thresholds (lbs)
1332214	Asbestos	0.0001
71432	Benzene	2
7440439	Cadmium	0.01
56235	Carbon tetrachloride	1
106934	Ethylene dibromide	0.5
107062	Ethylene dichloride	2
75218	Ethylene oxide	0.5
50000	Formaldehyde	5
18540299	Hexavalent chromium	0.0001
75092	Methylene chloride	50
7440020	Nickel	0.1
127184	Perchloroethylene	5
106990	1,3-Butadiene	0.1
7440382	Inorganic arsenic	0.01
7440417	Beryllium	0.001
75014	Vinyl chloride	0.5
7439921	Lead	0.5
123911	1,4-Dioxane	5
79016	Trichloroethylene	20
1086	Chlorinated dioxins, without individual isomers reported	0.000001
1746016	2,3,7,8-TCDD	0.000001
3268879	1-8OctaCDD	0.000001
19408743	1-3,7-9HxCDD	0.000001
35822469	1-4,6-8HpCDD	0.000001
39227286	1-4,7,8HxCDD	0.000001
40321764	1-3,7,8PeCDD	0.000001

**Rule 301 - Table IV (continued)**

CAS No.	Toxic Air Contaminants	Annual Emission Thresholds (lb)
57653857	1-3,6-8HxCDD	0.000001
1080	Chlorinated dibenzofurans, without individual isomers reported	0.000001
39001020	1-8OctaCDF	0.000001
51207319	2,3,7,8-TCDF	0.000001
55673897	1-4,7-9HpCDF	0.000001
57117314	2-4,7,8PeCDF	0.000001
57117416	1-3,7,8PeCDF	0.000001
57117449	1-3,6-8HxCDF	0.000001
60851345	2-4,6-8HxCDF	0.000001
67562394	1-4,6-8HpCDF	0.000001
70648269	1-4,7,8HxCDF	0.000001
72918219	1-3,7-9HxCDF	0.000001
1151	Polycyclic aromatic hydrocarbons, PAHs (without individual isomers reported)	0.2
50328	Benzo[a]pyrene [PAH, POM]	0.2
53703	Dibenz[a,h]anthracene [PAH, POM]	0.2
56495	3-Methylcholanthrene [PAH, POM]	0.2
56553	Benz[a]anthracene [PAH, POM]	0.2
57976	7,12-Dimethylbenz(a)Anthracene [PAH, POM]	0.2
91203	Naphthalene [PAH, POM]	0.2
189559	Dibenzo[a,i]pyrene [PAH, POM]	0.2
189640	Dibenzo[a,h]pyrene [PAH, POM]	0.2
191300	Dibenzo[a,l]pyrene [PAH, POM]	0.2
192654	Dibenzo[a,e]pyrene [PAH, POM]	0.2
193395	Indeno[1,2,3-cd]pyrene [PAH, POM]	0.2
194592	7H-Dibenzo(c,g)Carbazole [PAH, POM]	0.2
205823	Benzo[j]fluoranthene [PAH, POM]	0.2
205992	Benzo[b]fluoranthene [PAH, POM]	0.2
207089	Benzo[k]fluoranthene [PAH, POM]	0.2
218019	Chrysene [PAH, POM]	0.2
224420	Dibenz(a,j)Acridine [PAH, POM]	0.2
226368	Dibenz(a,h)Acridine [PAH, POM]	0.2
602879	5-Nitroacenaphthene [PAH, POM]	0.2
607578	2-Nitrofluorene [PAH, POM]	0.2
3697243	5-Methylchrysene [PAH, POM]	0.2
5522430	1-Nitropyrene [PAH, POM]	0.2

**Rule 301 - Table IV (concluded)**

CAS No.	Toxic Air Contaminants	Annual Emission Thresholds (lb)
7496028	6-Nitrochrysene [PAH, POM]	0.2
42397648	1,6-Dinitropyrene [PAH, POM]	0.2
42397659	1,8-Dinitropyrene [PAH, POM]	0.2
57835924	4-Nitropyrene [PAH, POM]	0.2
9901	Diesel Particulate Matter	0.1

**Ammonia Emission Factors**

Ammonia is required to be annually reported and its annual emissions threshold (200 pounds) is presented in Table III of Rule 301. Default ammonia emission factors from fuel combustion can be found in Appendix B of the [AB 2588 Quadrennial Air Toxics Emissions Inventory Reporting Procedures, June 2020](#).