

**E14 - ENGINE, NATURAL GAS FIRED, 2 CYCLE LEAN BURN, WITH CATALYTIC OXIDATION**

**CALCULATION METHODS**

$E_a = U_a \times EF$  (lbs/mmft<sup>3</sup>)

$E_h = U_h$  (scfm)  $\times$  (60/1000000)  $\times$  EF (lbs/mmft<sup>3</sup>)

**NOTES:**

- Catalytic oxidation can achieve efficiencies of approximately 70% in reducing CO, ROG, TOG, and AB 2588 toxic organic compounds.
- The trace organic factors listed below are based on detected AB 2588 compounds listed in AP-42 Table 3.2-1 (7/00).
- The AP-42 (7/00) emission factors have been converted into lbs/mmscf by assuming a natural gas BTU content of 1020 BTU/scf.
- PM10 and TSP emission factors include filterable and condensable PM in accordance with the District's definition of particulate matter.
- The listed AP-42 emission factors for 1,1,2-trichloroethane, 1,1-dichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, 1,3-dichloropropene, carbon tetrachloride, chloroform, ethylene dibromide, styrene, and vinyl chloride are NOT included since these values are based on nondetectable test results.
- The listed AP-42 emission factors for 1,1,2,2-tetrachloroethane, 1,2,4-trimethylbenzene, 2,2,4-trimethylpentane, 2-methylnaphthalene, acenaphthalene, acenaphthylene, anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, biphenyl, chlorobenzene, chrysene, cyclohexane, fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, perylene, phenanthrene, and pyrene are NOT included since these values were based on insignificant and/or nondetectable test results.
- Trace metal emission factors were not reported in AP-42 and are NOT included since natural gas fired engines are not expected to emit metals.
- The AP-42 emission factors for 1,2,3-trimethylbenzene, 1,3,5-trimethylpentane, butane, butyr/isobutyraldehyde, cyclopentane, ethane, isobutane, methylcyclohexane, n-nonane, n-octane, n-pentane, and propane are not included since these are not listed toxic air contaminants.
- The AP-42 acrolein emission factor is NOT included since this value is based on test data and detection limits from incorrect sampling methods. A District factor based on local test results and adjusted for equipment VOC controls is considered more accurate than the AP-42 value.

| Pollutant     | District Emission Factor (lbs/million ft <sup>3</sup> fuel burned) | EPA Reference Document             | EPA Factor | Units     | Comments  |
|---------------|--|------------------------------------|------------|-----------|---|
| NOx           | 3233.40  | AP-42, Sect 3.2, 7/00, Table 3.2-1 | 3.17E+00   | lbs/MMBTU |   |
| CO            | 118.32   | AP-42, Sect 3.2, 7/00, Table 3.2-1 | 3.86E-01   | lbs/MMBTU | Catalytic oxidation 70% control of value shown in Table 3.2-1                   |
| SOx           | 0.60   | AP-42, Sect 3.2, 7/00, Table 3.2-1 | 5.88E-04   | lbs/MMBTU | Assume a sulfur content of 0.05% and a fuel density of 7 lbs/gal                |
| TOG           | 501.84   | AP-42, Sect 3.2, 7/00, Table 3.2-1 | 1.64E+00   | lbs/MMBTU | Catalytic oxidation 70% control of value shown in Table 3.2-1                   |
| ROG           | 36.72  | AP-42, Sect 3.2, 7/00, Table 3.2-1 | 1.20E-01   | lbs/MMBTU | Catalytic oxidation 70% control of value shown in Table 3.2-1                   |
| TSP           | 49.28  | AP-42, Sect 3.2, 7/00, Table 3.2-1 | 4.83E-02   | lbs/MMBTU | TSP includes filterable (3.84 E-02) and condensable (9.91 E-03) PM.             |
| PM10          | 49.28  | AP-42, Sect 3.2, 7/00, Table 3.2-1 | 4.83E-02   | lbs/MMBTU | PM10 includes filterable (3.84 E-02) and condensable (9.91 E-03) PM.            |
| 1,3-Butadiene | 0.25   | AP-42, Sect 3.2, 7/00, Table 3.2-1 | 8.20E-04   | lbs/MMBTU | Catalytic oxidation 70% control of value shown in Table 3.2-1                   |
| Acetaldehyde  | 2.37   | AP-42, Sect 3.2, 7/00, Table 3.2-1 | 7.76E-03   | lbs/MMBTU | Catalytic oxidation 70% control of value shown in Table 3.2-1                   |
| Acrolein      | 0.03   | AP-42, Sect 3.2, 7/00, Table 3.2-1 | 7.78E-03   | lbs/MMBTU | District uncontrolled emission factor adjusted assuming 70% control efficiency. |

|                    |       |                                       |          |           |  |
|--------------------|-------|---------------------------------------|----------|-----------|--|
| Benzene            | 0.59  | AP-42, Sect 3.2, 7/00,<br>Table 3.2-1 | 1.94E-03 | lbs/MMBTU | Catalytic oxidation 70% control of value shown in<br>Table 3.2-1 |
| Ethylbenzene       | 0.03  | AP-42, Sect 3.2, 7/00,<br>Table 3.2-1 | 1.08E-04 | lbs/MMBTU | Catalytic oxidation 70% control of value shown in<br>Table 3.2-1 |
| Formaldehyde       | 16.89 | AP-42, Sect 3.2, 7/00,<br>Table 3.2-1 | 5.52E-02 | lbs/MMBTU | Catalytic oxidation 70% control of value shown in<br>Table 3.2-1 |
| Hexane             | 0.14  | AP-42, Sect 3.2, 7/00,<br>Table 3.2-1 | 4.45E-04 | lbs/MMBTU | Catalytic oxidation 70% control of value shown in<br>Table 3.2-1 |
| Methanol           | 0.76  | AP-42, Sect 3.2, 7/00,<br>Table 3.2-1 | 2.48E-03 | lbs/MMBTU | Catalytic oxidation 70% control of value shown in<br>Table 3.2-1 |
| Methylene Chloride | 0.04  | AP-42, Sect 3.2, 7/00,<br>Table 3.2-1 | 1.47E-04 | lbs/MMBTU | Catalytic oxidation 70% control of value shown in<br>Table 3.2-1 |
| Naphthalene        | 0.03  | AP-42, Sect 3.2, 7/00,<br>Table 3.2-1 | 9.63E-05 | lbs/MMBTU | Catalytic oxidation 70% control of value shown in<br>Table 3.2-1 |
| PAH                | 0.04  | AP-42, Sect 3.2, 7/00,<br>Table 3.2-1 | 1.34E-04 | lbs/MMBTU | Catalytic oxidation 70% control of value shown in<br>Table 3.2-1 |
| Phenol             | 0.01  | AP-42, Sect 3.2, 7/00,<br>Table 3.2-1 | 4.21E-05 | lbs/MMBTU | Catalytic oxidation 70% control of value shown in<br>Table 3.2-1 |
| Toluene            | 0.29  | AP-42, Sect 3.2, 7/00,<br>Table 3.2-1 | 9.63E-04 | lbs/MMBTU | Catalytic oxidation 70% control of value shown in<br>Table 3.2-1 |
| Xylenes            | 0.08  | AP-42, Sect 3.2, 7/00,<br>Table 3.2-1 | 2.68E-04 | lbs/MMBTU | Catalytic oxidation 70% control of value shown in<br>Table 3.2-1 |

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