Ozone production

Adapted from NCRP Report 51 and LEP Note 379 (via APresland_2005-10-10.pdf), under the assumption of no O_3 *decomposition* (yielding in the τ expression a neglected term kP_{eV}/V with k decomposition constant equal to 1.4 10^{-16} cm^3/eV):

$$C_{O_3} = \frac{C_{o_2} G P_{eV} \tau}{N_{Av}\left(\frac{\rho_{Air} V}{A_{Air}}\right)}\left(1 - e^{-\frac{t}{\tau}}\right) \qquad \tau = (\alpha + 1/\tau_{vent})^{-1} \quad \alpha = 2.3 \cdot 10^{-4}\,[s^{-1}] \quad O_3 \text{ dissociation constant}$$

$$C_{O_2} = 0.232 \quad G = 0.06 - 0.074\ [O_3/eV] \quad N_{Av}\frac{\rho_{Air}}{A_{Air}}@\,NTP = 2.50 \cdot 10^{19}\,[\text{molecules/cm}^3]$$

$$P_{eV}\,[\text{eV/s}] = 6.24 \cdot 10^{18}\,P[\text{W}] \qquad \dot{r} = \frac{1}{\tau_{vent}}[\text{air renewal/s}]$$

$$C_{O_3}[\text{ppm}] = 9.28 \cdot 10^{-15}\,G[\text{eV}^{-1}]\,\frac{P_{eV}\,[\text{eV/s}]\,\tau[s]}{V[\text{cm}^3]}\left(1 - e^{-\frac{t}{\tau}}\right)$$