Combustion Equation Balance (Stoich)

$$C_xH_yO_z + w_{air}(O_2 + 3.773N_2) \longrightarrow w_{CO2}CO_2 + w_{H2O}H_2O + w_{N2}N_2$$

$$\begin{aligned} C: &\quad x = w_{CO2} \\ H: &\quad y = 2w_{H2O} \\ O: &\quad z + 2w_{air} = 2w_{CO2} + w_{H2O} \\ N: &\quad 3.773(2)w_{air} = 2w_{N2} \end{aligned}$$

$$C_xH_yO_z + \left(x + \frac{y}{4} - \frac{z}{2}\right)(O_2 + 3.773N_2) \longrightarrow xCO_2 + \frac{y}{2}H_2O + 3.773\left(x + \frac{y}{4} - \frac{z}{2}\right)N_2$$