A3.1 HEAT BALANCE FOR COMBUSTION

\[ C_F w_F + h_A w_A + h_G w_G - Q_{ir} - Q_{is} - w_{EG} R_S \left(1 + \frac{Y}{100}\right) = V_F \frac{d}{dt} \left( \rho_{EG} w_{EG} \right) \]

- \( C_F \) = Calorific value of the fuel
- \( w_F \) = Fuel flow
- \( h_A \) = Specific enthalpy of air
- \( w_A \) = Air flow
- \( h_G \) = Exhaust gas specific enthalpy
- \( w_G \) = Exhaust gas flow
- \( Q_{ir} \) = Heat transferred by radiation to the risers
- \( Q_{is} \) = Heat transferred by radiation to the superheter
- \( w_{EG} \) = Gas mass flow through the boiler
- \( R_S \) = Stoichiometric air/fuel volume ratio
- \( y \) = The percentage excess air level
\( h_{EG} \) = Gas specific enthalpy

\( V_F \) = Combustion chamber volume

\( \rho_{EG} \) = Gas density

### A3.2 MASS BALANCE FOR COMBUSTION

Mass balance for combustion:

\[
\frac{d}{dt} V_F \rho_{EG} = w_F + w_A + w_G - w_{EG} = V_F \frac{d}{dt} \rho_{EG}
\]

\( w_F \) = Fuel flow

\( w_A \) = Air flow

\( w_G \) = Exhaust gas flow

\( w_{EG} \) = Gas mass flow through the boiler

\( V_F \) = Combustion chamber volume

\( \rho_{EG} \) = Gas density