Calculation of concentrations and mass emissions

To calculate a concentration the mass of the substance collected during sampling is divided by the volume of stack gas sampled.

1. Concentration = mass of substance / sample volume
   To convert a concentration to a mass emission it is necessary to know the discharge of gas from the stack.

2. Volume discharge (m^3s^{-1}) = velocity of gas (ms^{-1}) x cross-sectional area of stack ($mg.m^3$)

3. Mass emission (e.g. $kg.hour^{-1}$) = concentration ($mg.m^3$) x volume discharge (m^3s^{-1}) 10^{-6} x 3600 The calculation is only valid when the concentration and volume flow terms are in same units of temperature, pressure, moisture content and reference oxygen. To avoid mistakes, it is advisable that data management procedures ensure that the two terms (volume flow and concentration) are available in either of the following formats; (1) fully corrected to reference conditions, or (2) at stack conditions.