

1. Calibration of LiCor6262 for co2.ec and h2o.ec:

July 2003 Coefficients: To= 40.27 + 273.15 ToH= 40.32 + 273.15
(li6262, IRG3-368) A= 0.137854 AH= 6.1402 x 10⁻³
 B= 1.29799 x 10⁻⁵ BH= 2.98828 x 10⁻⁶
 C= 4.95653 x 10⁻⁹ CH= -2.50046 x 10⁻¹¹
 D= -4.96846 x 10⁻¹³
 E= 3.26813 x 10⁻¹⁷ T_{ec}= 273.15 + (50/4096)T_{ec}.mV
 Po= 101.3 kPa P_{ec}= 59.123 + 0.0152 P_{ec}.mV

Offset= CO2 zero (mV) H.offset = H2O zero (mV)
S= CO2 span coefficient (approx 1), span gas= 416.7 ppm

note: Offset, H.offset, and S are derived from 4-hour calibrations

Water Vapor (h2o.ec) Equation (do first):

$$x = (\text{h2o.ec.mV} - \text{H.offset}) \left(\frac{P_o}{P_{\text{ec}}} \right)^{0.9} \quad (1)$$

$$\text{h2o.ec} = \left(\frac{T}{T_oH} \right) (AHx + BHx^2 + CHx^3) \equiv \text{mmol mol}^{-1} \quad (2)$$

Carbon Dioxide (co2.ec) Equation:

Pressure Broadening Term:

$$\Omega = 1 + \left(\frac{0.5 \cdot \text{h2o.ec}}{1000} \right) \quad (3)$$

then,

$$x = \left(\frac{P_o \cdot S}{P_{\text{ec}} \cdot \Omega} \right) (\text{co2.ec.mV} - \text{Offset}) \quad (4)$$

$$[CO_2]^* = \left(\Omega \frac{T_{\text{ec}}}{T_o} \right) (Ax + Bx^2 + Cx^3 + Dx^4 + Ex^5) \equiv \text{ppm} \quad (5)$$

Final dilution correction:

$$[CO_2]_{\text{final}} = [CO_2]^* \left(1 - \frac{\text{h2o.ec}}{1000} \right)^{-1} \quad (6)$$