Please do not change any of the values in this sheet

Atmospheric air pressure - (As recorded from engine data)	985	[mBar]
	98500	[Pa]
	5	[C]
	278	[K]
	80	[%]

$$\rho_{\text{humid air}} = \frac{p_d}{R_d T} + \frac{p_v}{R_v T} = \frac{p_d M_d + p_v M_v}{RT}$$ [1]

where:

Density of the humid air (kg/m³) — $\rho_{\text{humid air}} =$ **1.231049** Kg/m3

Partial pressure of dry air (Pa)

Specific gas constant for dry air, 287.058 J/(kg·K)

Temperature (K) — 0.26430544

Pressure of water vapor (Pa)

Specific gas constant for water vapor, 461.495 J/(kg·K)

Molar mass of dry air, 0.028964 (kg/mol)

Molar mass of water vapor, 0.018016 (kg/mol)

Universal gas constant, 8.314 J/(K·mol)

$$\rho = \frac{p}{R_{\text{specific}} T}$$ **1.2343** [kg/m3]

R = 287.058 J/Kg K

T = Temperature in degrees Kelvin

P = Absolute Pressure in Pa

The vapor pressure of water may be calculated from the saturation vapor pressure and relative humidity. It is found by:

$$p_v = \phi p_{\text{sat}}$$

Pu = **697.8171** [Pa]

Where:

Vapor pressure of water

Relative humidity

Saturation vapor pressure

The saturation vapor pressure of water at any given temperature is the vapor pressure when relative humidity is 100%. One formula [1] used to find the saturation vapor pressure is:

$$p_{\text{sat}} = 6.1078 \times 10^{\frac{7.5T}{T+237.3}}$$

Psat = **8.722714** hPa

Psat = **872.2714** [Pa]

where T is in degrees C. Note:

This will give a result in hPa (100 Pa, equivalent to the older unit millibar, 1 mbar = 0.001 bar = 0.1 kPa)

is found considering partial pressure, resulting in:

Pd= **97802.18** [Pa]

Where p simply denotes the observed absolute pressure.