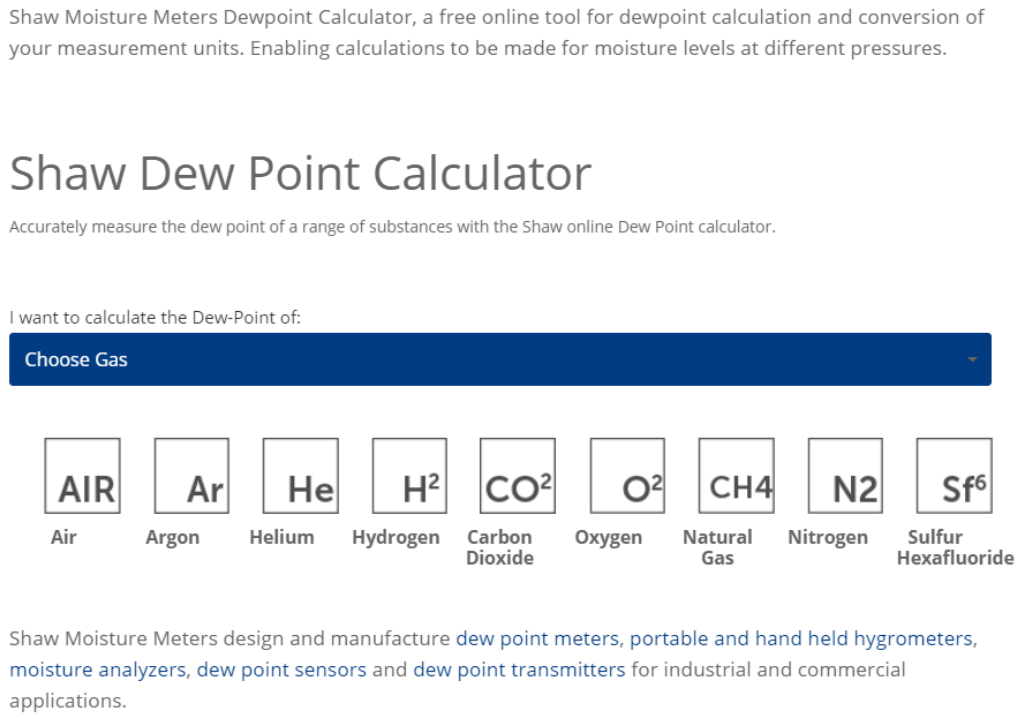
Technical Bulletin: Using the online Shaw Dew Point calculator APP

https://www.shawmeters.com/shaw-dewpoint-calculator/



For pressure dewpoints, the calculator uses the Magnus formula to derive the saturation vapour pressure based on the user input; for dewpoints above 0°C this is given as:

$$ln\ ew(t) = ln\ 611.2 + (17.62\ t) / (243.12+t)$$

where temperature *t* is in °C and the saturation vapour pressure *ew(t)* is in pascals (Pa)

For frostpoint, water over ice, where dewpoints are below 0°C the formula is:

$$ln\ ew(t) = ln\ 611.2 + (22.46\ t\ )/ (272.62+t)$$

From Dalton's Law, the water vapour pressure of a gas, as a partial pressure, will increase with increasing absolute pressure of the gas mixture. By combining the

saturation vapour pressure derived above with the line pressure input from the user, the formula can be used in reverse to define the dewpoint temperature of the gas at line pressure in °C

For further reading, please find a link to the UK's National Physical Laboratory website which I'm sure has a more succinct way of explaining the formulas in question.

https://www.npl.co.uk/resources/q-a/how-do-i-convert-between-units-of-dew-point-and-re

The engineering units ppmV, g/m³ and lb/MMSCF are derived from the saturation vapour pressure in the formulas above but, as absolute values of moisture concentration, they are unaffected by pressure and so the conversions are equivalent to dewpoint temperature at atmospheric pressure:

ppmV = (ew(t) x 1000000) / 101325 where *ew(t)* is in pascals (Pa)

g/m³ = (ew(t) x 18.02) / 2400.344

lb/MMSCF = g/m³ x 62.4219

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