The Engineering Box (TEB) Manual

v 1.00

UNIT CONVERSION FUNCTIONS

FUNCTION: M3ToNM3 (VOLUME; TEMPERATURE; PRESSURE)

* Purpose: Converts gas volume in m^3 at a specifiec temperature and pressure to
* Nm^3
* Arguments: volume in m^3, temperature in Kelvin, pressure in Pa
* Result: volume in Nm^3
* Usage example: =m3ToNm3(50 ; 500 ; 101325)

FUNCTION: NM3ToM3(VOLUME, TEMPERATURE, PRESSURE)

* Purpose: : converts from volume in Normal Conditions (273.15K, 101325 Pa) Nm^3 to
* volume in the user defined temperature (K) and presure (Pa)
* Arguments: volume in Nm^3, temperature in Kelvin, pressure in Pa
* Result: volume in m^3
* Usage example: =Nm3Tom3(50 ; 500 ; 101325)

FUNCTION: KGToNM3(MASS, MOLAR MASS)

* Purpose: : converts a gas mass in kg to its respective volume in Nm3 (273.15 K,
* 101325 Pa)
* Arguments: mass in Kg, molar mass in g/mol
* Result: volume in Nm^3
* Usage example: = KgToNm3(1.295 ; 28.97)

FUNCTION: PAToMMH20 (PRESSURE)

* Purpose: : converts from Pa to mmH20
* Arguments: pressure in Pa
* Result: pressure in mm H2O
* Usage example: =PaToMmH2O(101325)

FUNCTION: mmH20ToPa (PRESSURE)

- Purpose: : converts from Pa to mmH20
- Arguments: pressure in mm H2O
- Result: pressure in Pa
- Usage example: =mmH2OToPa(1000)

FUNCTION: KelvinToCelsius(TEMPERATURE)

- Purpose: : converts from Kelvin to Celsius
- Arguments: temperature in Kelvin
- Result: temperature in Celsius
- Usage example: = KelvinToCelsius(273.15)

FUNCTION: CelsiusToKelvin (TEMPERATURE)

- Purpose: : converts from Celsius to Kelvin
- Arguments: temperature in Celsius
- Result: temperature in Kelvin
- Usage example: = CelsiusToKelvin (100)

FUNCTION: RankineToCelsius (TEMPERATURE)

- Purpose: : converts from Rankine to Celsius
- Arguments: temperature in Rankine
- Result: temperature in Celsius
- Usage example: = RankineToCelsius (546)

FUNCTION: KelvinToRankine (TEMPERATURE)

- Purpose: : converts from Kelvin to Rankine
- Arguments: temperature in Kelvin
- Result: temperature in Rankine
- Usage example: = KelvinToRankine (273.15)

FUNCTION: JouleTocal (ENERGY)

- Purpose: : converts energy from Joule to Calories
- Arguments: energy in Joules
- Result: energy in Calories
- Usage example: = JouleTocal (100)

DIMENSIONLESS NUMBERS FUNCTIONS

FUNCTION: ARCHIMEDESNUMBER (PARTICLE DIAMETER, PARTICLE DENSITY, GAS DENSITY, GAS DYNAMIC VISCOSITY)
- Purpose: : Computes the Archimedes Number
- Arguments: particle diameter in m, particle density in kg/m^3, gas density in kg/m^3,
- gas dynamic viscosity in kg m/s
- Result: dimensionless Archimedes Number
- Usage example: = archimedesNumber(1e-4; 1600; 1.185; 1.8e-5)

FUNCTION: REYNOLDSNUMBER (LENGHT, DENSITY, VELOCITY, VISCOSITY)
- Purpose: : Computes the standard Reynolds number
- Arguments: lenght in m, density in kg/m^3, velocity in m/s, dynamic viscosity in kg
- m/s
- Result: dimensionless Reynolds Number
- Usage example: = reynoldsNumber(5; 1; 1.3; 3e-4)

PHYSICAL PROPERTIES / CORRELATION FUCTIONS

FUNCTION: IDEALGASDENSITY(MOLAR MASS, PRESSURE, TEMPERATURE)
- Purpose: : : computes the density of a gas following the ideal gas law
- Arguments: molar mass in g/mol, pressure in Pa, temperature in celsius
- Result: the gas density in kg/m^3
- Usage example: = idealGasDensity(28.97 ; 101325 ; 15)

FUNCTION: AIRVISCOSITY(TEMPERATURE)
- Purpose: Computes the atmospheric air (1 atm) viscosity following Sutherland's
- formula
- Arguments: temperature in celsius
- Result: air viscosity in kg m/s
- Usage example: = airViscosity(105)