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Refrigeration Parameters Formulas

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List of 11 Refrigeration Parameters Formulas

Refrigeration Parameters

1) Degree of Saturation

Open Calculator

fx $$S = \frac{V_w}{V_v}$$

ex $$0.333333 = \frac{2m^3}{6.000m^3}$$

2) Density of Two Liquids

Open Calculator

fx $$\rho_{ab} = \frac{M_A + M_B}{\frac{M_A}{\rho_a} + \frac{M_B}{\rho_b}}$$

ex $$18kg/m^3 = \frac{3.00kg + 6.00kg}{\frac{3.00kg}{15kg/m^3} + \frac{6.00kg}{20kg/m^3}}$$

3) Dew Point Depression

Open Calculator

fx $$d_{pd} = T - d_{pt}$$

ex $$185K = 85K - -100K$$

4) Real Refrigerator

Open Calculator

fx $$R = \frac{Q_{low}}{W}$$

ex $$0.8 = \frac{200J}{250J}$$

5) Refrigerator Work

Open Calculator

fx $$R_w = Q_{high} - Q_{low}$$

ex $$600J = 800J - 200J$$

6) Relative Density

Open Calculator

fx $$R_D = \frac{\rho}{\rho_w}$$

ex $$0.997 = \frac{997kg/m^3}{1000.00kg/m^3}$$

7) Shaft Power

Open Calculator

fx $$P_{shaft} = 2 \cdot \pi \cdot \dot{n} \cdot \tau$$

ex $$2.199115kW = 2 \cdot \pi \cdot 7Hz \cdot 50N*m$$

8) Specific Humidity

Open Calculator

$$\mathrm{SH} = 0.622 \cdot \Phi \cdot \frac{\mathrm{PA^o}}{\mathrm{p_{partial}} - \Phi \cdot \mathrm{PA^o}}$$

$$0.620592 = 0.622 \cdot 0.616523 \cdot \frac{2700\mathrm{Pa}}{3333\mathrm{Pa} - 0.616523 \cdot 2700\mathrm{Pa}}$$

9) Spring Work

Open Calculator

$$\mathrm{W_{spring}} = \mathrm{K_{spring}} \cdot \frac{\mathrm{x_2^2} - \mathrm{x_1^2}}{2}$$

$$478.125\mathrm{J} = 51\mathrm{N/m} \cdot \frac{(5\mathrm{m})^2 - (2.5\mathrm{m})^2}{2}$$

10) Vapour Quality

Open Calculator

$$\chi = \frac{\mathrm{m_g}}{\mathrm{m_g} + \mathrm{m_f}}$$

$$0.142857 = \frac{0.15\mathrm{kg}}{0.15\mathrm{kg} + 0.9\mathrm{kg}}$$

11) Water Equivalent

Open Calculator

$$\mathrm{W_e} = \mathrm{M_w} \cdot \mathrm{c}$$

$$6\mathrm{kg} = 0.05\mathrm{kg} \cdot 120\mathrm{J/(kg*K)}$$

Variables Used

- **c** Specific Heat *(Joule per Kilogram per K)*
- **d_{pd}** Dew Point Depression *(Kelvin)*
- **d_{pt}** Dew Point Temperature *(Kelvin)*
- **K_{spring}** Spring Constant *(Newton per Meter)*
- **M_A** Mass of Liquid A *(Kilogram)*
- **M_B** Mass of Liquid B *(Kilogram)*
- **m_f** Fluid Mass *(Kilogram)*
- **m_g** Vapour Mass *(Kilogram)*
- **M_w** Mass of Water *(Kilogram)*
- **$\dot{n}$** Revolutions per Second *(Hertz)*
- **$p_{partial}$** Partial Pressure *(Pascal)*
- **P_{shaft}** Shaft Power *(Kilowatt)*
- **PA^o** Vapor Pressure of Pure Component A *(Pascal)*
- **Q_{high}** Heat from High Temperature Reservoir *(Joule)*
- **Q_{low}** Heat from Low Temperature Reservoir *(Joule)*
- **R** Real Refrigerator
- **R_D** Relative Density
- **R_w** Refrigerator Work *(Joule)*
- **S** Degree of Saturation
- **SH** Specific Humidity
- **T** Temperature *(Kelvin)*

- V_v Volume of Voids *(Cubic Meter)*
- V_w Volume of Water *(Cubic Meter)*
- W Work *(Joule)*
- W_e Water Equivalent *(Kilogram)*
- W_{spring} Spring Work *(Joule)*
- x_1 Displacement at Point 1 *(Meter)*
- x_2 Displacement at Point 2 *(Meter)*
- ρ Density *(Kilogram per Cubic Meter)*
- ρ_a Density of Liquid A *(Kilogram per Cubic Meter)*
- ρ_{ab} Density of Two Liquids *(Kilogram per Cubic Meter)*
- ρ_b Density of Liquid B *(Kilogram per Cubic Meter)*
- ρ_w Water Density *(Kilogram per Cubic Meter)*
- τ Torque Exerted on Wheel *(Newton Meter)*
- Φ Relative Humidity
- χ Vapour Quality

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant
- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Weight** in Kilogram (kg)
  Weight Unit Conversion
- Measurement: **Temperature** in Kelvin (K)
  Temperature Unit Conversion
- Measurement: **Volume** in Cubic Meter (m^3)
  Volume Unit Conversion
- Measurement: **Pressure** in Pascal (Pa)
  Pressure Unit Conversion
- Measurement: **Energy** in Joule (J)
  Energy Unit Conversion
- Measurement: **Power** in Kilowatt (kW)
  Power Unit Conversion
- Measurement: **Frequency** in Hertz (Hz)
  Frequency Unit Conversion
- Measurement: **Specific Heat Capacity** in Joule per Kilogram per K (J/(kg*K))
  Specific Heat Capacity Unit Conversion
- Measurement: **Density** in Kilogram per Cubic Meter (kg/m^3)
  Density Unit Conversion
- Measurement: **Torque** in Newton Meter (N*m)
  Torque Unit Conversion

- Measurement: **Stiffness Constant** in Newton per Meter (N/m)
  Stiffness Constant Unit Conversion

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