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Newton's Friction Postulation Formulas

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List of 9 Newton's Friction Postulation Formulas

Newton's Friction Postulation

1) Dynamic Viscosity given Kinematic Viscosity

$$fx \quad \mu = \nu_s \cdot \rho_f$$

[Open Calculator !\[\]\(a870788d6ed9b8fd294b7654a8c8526b_img.jpg\)](#)

$$ex \quad 924Pa \cdot s = 12m^2/s \cdot 77kg/m^3$$

2) Dynamic Viscosity of Fluid given Fluid Filling Width between Plates

$$fx \quad \mu = \frac{\sigma \cdot y}{V_f}$$

[Open Calculator !\[\]\(c50c8b7b2cc2cf9ff925edec0ee94c0d_img.jpg\)](#)

$$ex \quad 924Pa \cdot s = \frac{18.48Pa \cdot 1000mm}{20m/s}$$

3) Dynamic Viscosity of Fluid given Shear Force per Unit Area or Shear Stress

$$fx \quad \mu = \frac{\sigma}{du/dy}$$

[Open Calculator !\[\]\(f60b7a900783ac3fd531bfd9c111be6d_img.jpg\)](#)

$$ex \quad 924Pa \cdot s = \frac{18.48Pa}{0.02}$$



4) Fluid Filling Width between Plates given Shear Force Per Unit Area or Shear Stress

$$fx \quad y = \frac{\mu \cdot V_f}{\sigma}$$

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235_img.jpg\)](#)

$$ex \quad 1000mm = \frac{924Pa \cdot s \cdot 20m/s}{18.48Pa}$$

5) Mass Density of Fluid for given Kinematic Viscosity

$$fx \quad \rho_f = \frac{\mu}{v_s}$$

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0_img.jpg\)](#)

$$ex \quad 77kg/m^3 = \frac{924Pa \cdot s}{12m^2/s}$$

6) Relationship between Dynamic Viscosity and Kinematic Viscosity

$$fx \quad v_s = \frac{\mu}{\rho_f}$$

[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f_img.jpg\)](#)

$$ex \quad 12m^2/s = \frac{924Pa \cdot s}{77kg/m^3}$$

7) Shear Force Per Unit Area or Shear Stress

$$fx \quad \sigma = \mu \cdot du/dy$$

[Open Calculator !\[\]\(b64b40baaee5acddc1eab8538ba84754_img.jpg\)](#)

$$ex \quad 18.48Pa = 924Pa \cdot s \cdot 0.02$$



8) Velocity Gradient given Shear Force per unit Area or Shear Stress

[Open Calculator !\[\]\(dfbd6b3763a6d1d9afaa974f64e2e4b5_img.jpg\)](#)

$$\text{fx } du/dy = \frac{\sigma}{\mu}$$

$$\text{ex } 0.02 = \frac{18.48\text{Pa}}{924\text{Pa}\cdot\text{s}}$$

9) Velocity of Upper Plate given Shear force per unit Area or Shear Stress

[Open Calculator !\[\]\(ec9132f1d27c8919987d92907322654d_img.jpg\)](#)

$$\text{fx } V_f = \frac{\sigma \cdot y}{\mu}$$

$$\text{ex } 20\text{m/s} = \frac{18.48\text{Pa} \cdot 1000\text{mm}}{924\text{Pa}\cdot\text{s}}$$









Variables Used

- du/dy Velocity Gradient
- V_f Velocity of Fluid (Meter per Second)
- ν_s Kinematic Viscosity at 20° C (Square Meter per Second)
- y Width between the Plates (Millimeter)
- μ Dynamic Viscosity (Pascal Second)
- ρ_f Mass Density of Fluid (Kilogram per Cubic Meter)
- σ Shear Stress of Fluid (Pascal)



Constants, Functions, Measurements used

- **Measurement: Length** in Millimeter (mm)
Length Unit Conversion 
- **Measurement: Speed** in Meter per Second (m/s)
Speed Unit Conversion 
- **Measurement: Dynamic Viscosity** in Pascal Second (Pa*s)
Dynamic Viscosity Unit Conversion 
- **Measurement: Kinematic Viscosity** in Square Meter per Second (m²/s)
Kinematic Viscosity Unit Conversion 
- **Measurement: Density** in Kilogram per Cubic Meter (kg/m³)
Density Unit Conversion 
- **Measurement: Stress** in Pascal (Pa)
Stress Unit Conversion 



Check other formula lists

- **Newton's Friction Postulation Formulas** 

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