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Darcy's Weisbach Equation Formulas

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List of 10 Darcy's Weisbach Equation Formulas

Darcy's Weisbach Equation

1) Average Velocity of Flow given Head Loss

Open Calculator

fx $$v_{avg} = \sqrt{\frac{h_f \cdot 2 \cdot [g] \cdot D_p}{4 \cdot f \cdot L_p}}$$

ex $$4.573932\text{m/s} = \sqrt{\frac{1.2\text{m} \cdot 2 \cdot [g] \cdot 0.4\text{m}}{4 \cdot 0.045 \cdot 2.5\text{m}}}$$

2) Average Velocity of Flow given Internal Radius of Pipe

Open Calculator

fx $$v_{avg} = \sqrt{\frac{h_f \cdot [g] \cdot R}{f \cdot L_p}}$$

ex $$4.573932\text{m/s} = \sqrt{\frac{1.2\text{m} \cdot [g] \cdot 200\text{mm}}{0.045 \cdot 2.5\text{m}}}$$

3) Darcy's Coefficient of Friction given Head Loss

Open Calculator

$$f = \frac{h_f \cdot 2 \cdot [g] \cdot D_p}{4 \cdot L_p \cdot (v_{avg})^2}$$

$$0.045077 = \frac{1.2\text{m} \cdot 2 \cdot [g] \cdot 0.4\text{m}}{4 \cdot 2.5\text{m} \cdot (4.57\text{m/s})^2}$$

4) Darcy's Coefficient of Friction given Internal Radius of Pipe

Open Calculator

$$f = \frac{h_f \cdot [g] \cdot R}{L_p \cdot (v_{avg})^2}$$

$$0.045077 = \frac{1.2\text{m} \cdot [g] \cdot 200\text{mm}}{2.5\text{m} \cdot (4.57\text{m/s})^2}$$

5) Head Loss due to Friction by Darcy Weisbach Equation

Open Calculator

$$h_f = \frac{4 \cdot f \cdot L_p \cdot (v_{avg})^2}{2 \cdot [g] \cdot D_p}$$

$$1.197938\text{m} = \frac{4 \cdot 0.045 \cdot 2.5\text{m} \cdot (4.57\text{m/s})^2}{2 \cdot [g] \cdot 0.4\text{m}}$$

6) Head Loss due to Friction given Internal Radius of Pipe

Open Calculator

fx $$h_f = \frac{f \cdot L_p \cdot (v_{avg})^2}{[g] \cdot R}$$

ex $$1.197938\text{m} = \frac{0.045 \cdot 2.5\text{m} \cdot (4.57\text{m/s})^2}{[g] \cdot 200\text{mm}}$$

7) Internal Diameter of Pipe given Head Loss

Open Calculator

fx $$D_p = \frac{4 \cdot f \cdot L_p \cdot (v_{avg})^2}{2 \cdot [g] \cdot h_f}$$

ex $$0.399313\text{m} = \frac{4 \cdot 0.045 \cdot 2.5\text{m} \cdot (4.57\text{m/s})^2}{2 \cdot [g] \cdot 1.2\text{m}}$$

8) Internal Radius of Pipe given Head Loss

Open Calculator

fx $$R = \frac{f \cdot L_p \cdot (v_{avg})^2}{[g] \cdot h_f}$$

ex $$199.6563\text{mm} = \frac{0.045 \cdot 2.5\text{m} \cdot (4.57\text{m/s})^2}{[g] \cdot 1.2\text{m}}$$

9) Length of Pipe given Head Loss due to Friction

Open Calculator

fx
$$L_p = \frac{h_f \cdot 2 \cdot [g] \cdot D_p}{4 \cdot f \cdot (v_{avg})^2}$$

ex
$$2.504304\text{m} = \frac{1.2\text{m} \cdot 2 \cdot [g] \cdot 0.4\text{m}}{4 \cdot 0.045 \cdot (4.57\text{m/s})^2}$$

10) Length of Pipe given Internal Radius of Pipe

Open Calculator

fx
$$L_p = \frac{h_f \cdot [g] \cdot R}{f \cdot (v_{avg})^2}$$

ex
$$2.504304\text{m} = \frac{1.2\text{m} \cdot [g] \cdot 200\text{mm}}{0.045 \cdot (4.57\text{m/s})^2}$$

Variables Used

- D_p Diameter of Pipe *(Meter)*
- f Darcy's Coefficient of Friction
- h_f Head Loss *(Meter)*
- L_p Length of Pipe *(Meter)*
- R Pipe Radius *(Millimeter)*
- v_{avg} Average Velocity in Pipe Fluid Flow *(Meter per Second)*

Constants, Functions, Measurements used

- Constant: **[g]**, 9.80665
  Gravitational acceleration on Earth
- Function: **sqrt**, sqrt(Number)
  A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.
- Measurement: **Length** in Meter (m), Millimeter (mm)
  Length Unit Conversion
- Measurement: **Speed** in Meter per Second (m/s)
  Speed Unit Conversion

Check other formula lists

- **Darcy's Weisbach Equation Formulas**
- **Hazen Williams Formula Formulas**
- **Manning's Formula Formulas**

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