Important Darcy's Weisbach Equation Formulas PDF

Formulas
Examples
with Units

List of 10
Important Darcy's Weisbach Equation Formulas

1) Average Velocity of Flow given Head Loss Formula

Evaluate Formula

Formula

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

Example with Units

$$4.5739\,\text{m/s} = \sqrt{\frac{1.2\,\text{m} \cdot 2 \cdot 9.8066\,\text{m/s}^2 \cdot 0.4\,\text{m}}{4 \cdot 0.045 \cdot 2.5\,\text{m}}}$$

2) Average Velocity of Flow given Internal Radius of Pipe Formula

Evaluate Formula

Formula

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

Example with Units

$$4.5739\,\text{m/s} = \sqrt{\frac{1.2\,\text{m} \cdot 9.8066\,\text{m/s}^2 \cdot 200\,\text{mm}}{0.045 \cdot 2.5\,\text{m}}}$$

3) Darcy's Coefficient of Friction given Head Loss Formula

Evaluate Formula

Formula

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

Example with Units

$$0.0451 = \frac{1.2\,\text{m} \cdot 2 \cdot 9.8066\,\text{m/s}^2 \cdot 0.4\,\text{m}}{4 \cdot 2.5\,\text{m} \cdot \left(4.57\,\text{m/s}\right)^2}$$

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

Evaluate Formula

Formula

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

Example with Units

$$0.0451 = \frac{1.2\,\text{m} \cdot 9.8066\,\text{m/s}^2 \cdot 200\,\text{mm}}{2.5\,\text{m} \cdot \left(4.57\,\text{m/s}\right)^2}$$

5) Head Loss due to Friction by Darcy Weisbach Equation Formula

Evaluate Formula

Formula

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

Example with Units

$$1.1979\,\text{m} = \frac{4 \cdot 0.045 \cdot 2.5\,\text{m} \cdot \left(4.57\,\text{m/s}\right)^2}{2 \cdot 9.8066\,\text{m/s}^2 \cdot 0.4\,\text{m}}$$

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

Evaluate Formula

Formula

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

Example with Units

$$1.1979\,\text{m} = \frac{0.045 \cdot 2.5\,\text{m} \cdot \left(4.57\,\text{m/s}\right)^2}{9.8066\,\text{m/s}^2 \cdot 200\,\text{mm}}$$

7) Internal Diameter of Pipe given Head Loss Formula

Evaluate Formula

Formula

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

Example with Units

$$0.3993\,\text{m} = \frac{4 \cdot 0.045 \cdot 2.5\,\text{m} \cdot \left(4.57\,\text{m/s}\right)^2}{2 \cdot 9.8066\,\text{m/s}^2 \cdot 1.2\,\text{m}}$$

8) Internal Radius of Pipe given Head Loss Formula

Evaluate Formula

Formula

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

Example with Units

$$199.6563\,\text{mm} = \frac{0.045 \cdot 2.5\,\text{m} \cdot \left(4.57\,\text{m/s}\right)^2}{9.8066\,\text{m/s}^2 \cdot 1.2\,\text{m}}$$

9) Length of Pipe given Head Loss due to Friction Formula

Evaluate Formula

Formula

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

Example with Units

$$2.5043\,\text{m} = \frac{1.2\,\text{m} \cdot 2 \cdot 9.8066\,\text{m/s}^2 \cdot 0.4\,\text{m}}{4 \cdot 0.045 \cdot \left(4.57\,\text{m/s}\right)^2}$$

10) Length of Pipe given Internal Radius of Pipe Formula

Evaluate Formula

Formula

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

Example with Units

$$2.5043\,\text{m} = \frac{1.2\,\text{m} \cdot 9.8066\,\text{m/s}^2 \cdot 200\,\text{mm}}{0.045 \cdot \left(4.57\,\text{m/s}\right)^2}$$

Variables used in list of Darcy's Weisbach Equation Formulas above

- 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 in list of Darcy's Weisbach Equation Formulas above

- constant(s): **[g]**, 9.80665
  Gravitational acceleration on Earth
- Functions: **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

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