Important Manning's Formula Formulas PDF

Formulas
Examples
with Units

List of 18
Important Manning's Formula Formulas

1) Diameter of Pipe given Head loss by Manning Formula Formula

Evaluate Formula

Formula

$$D_p = \left(\frac{Lp_{'} \cdot \left(n \cdot v_f \right)^2}{0.157 \cdot h_f} \right)^{\frac{3}{4}}$$

Example with Units

$$0.4067\,\text{m} = \left(\frac{4.90\,\text{m} \cdot \left(0.009 \cdot 11.96\,\text{m/s} \right)^2}{0.157 \cdot 1.2\,\text{m}} \right)^{\frac{3}{4}}$$

2) Diameter of Pipe given Velocity of Flow in Pipe by Manning Formula Formula

Evaluate Formula

Formula

$$D_p = \left(\frac{v_f \cdot n}{0.397 \cdot \left(S^{\frac{1}{2}} \right)} \right)^{\frac{3}{2}}$$

Example with Units

$$0.3993\,\text{m} = \left(\frac{11.96\,\text{m/s} \cdot 0.009}{0.397 \cdot \left(0.25^{\frac{1}{2}} \right)} \right)^{\frac{3}{2}}$$

3) Head loss by Manning Formula Formula

Evaluate Formula

Formula

$$h_f = \frac{Lp_{'} \cdot \left(n \cdot v_f \right)^2}{0.157 \cdot \left(D_p \right)^{\frac{4}{3}}}$$

Example with Units

$$1.227\,\text{m} = \frac{4.90\,\text{m} \cdot \left(0.009 \cdot 11.96\,\text{m/s} \right)^2}{0.157 \cdot \left(0.4\,\text{m} \right)^{\frac{4}{3}}}$$

4) Head loss by Manning Formula given Radius of Pipe Formula

Evaluate Formula

Formula

$$h_f = \frac{Lp_{'} \cdot \left(n \cdot v_f \right)^2}{0.157 \cdot \left(2 \cdot R \right)^{\frac{4}{3}}}$$

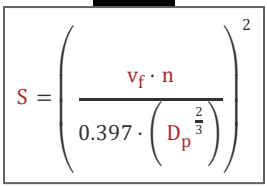
Example with Units

$$1.227\,\text{m} = \frac{4.90\,\text{m} \cdot \left(0.009 \cdot 11.96\,\text{m/s} \right)^2}{0.157 \cdot \left(2 \cdot 200\,\text{mm} \right)^{\frac{4}{3}}}$$

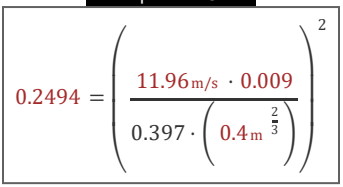
5) Hydraulic Gradient by Manning Formula given Diameter Formula

Evaluate Formula

Formula



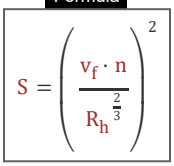
Example with Units



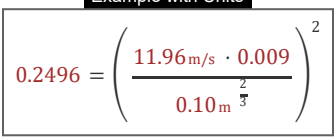
6) Hydraulic Gradient given Velocity of Flow in Pipe by Manning Formula Formula

Evaluate Formula

Formula



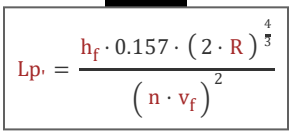
Example with Units



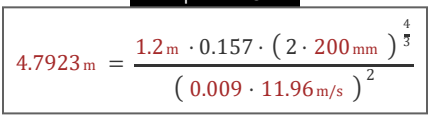
7) Length of Pipe by Manning Formula given Radius of Pipe Formula

Evaluate Formula

Formula



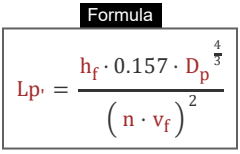
Example with Units



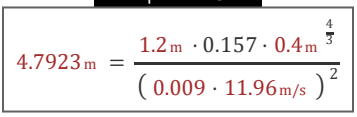
8) Length of Pipe given Head loss by Manning Formula Formula

Evaluate Formula

Formula



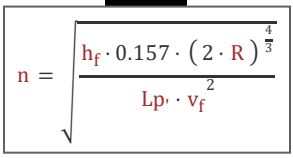
Example with Units



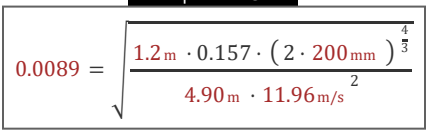
9) Manning's Coefficient by Manning Formula given Radius of Pipe Formula

Evaluate Formula

Formula



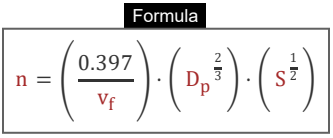
Example with Units



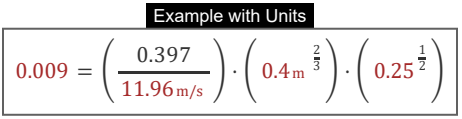
10) Manning's Coefficient given Diameter of Pipe Formula

Evaluate Formula

Formula



Example with Units



11) Manning's Coefficient given Head loss by Manning Formula Formula

Evaluate Formula

Formula

$$n = \sqrt{\frac{h_f \cdot 0.157 \cdot D_p^{\frac{4}{3}}}{Lp_, \cdot v_f^{2}}}$$

Example with Units

$$0.0089 = \sqrt{\frac{1.2\,\text{m} \cdot 0.157 \cdot 0.4\,\text{m}^{\frac{4}{3}}}{4.90\,\text{m} \cdot 11.96\,\text{m/s}^{2}}}$$

12) Manning's Coefficient given Velocity of Flow Formula

Evaluate Formula

Formula

$$n = \frac{\left(R_h^{\frac{2}{3}}\right) \cdot \left(S^{\frac{1}{2}}\right)}{v_f}$$

Example with Units

$$0.009 = \frac{\left(0.10\,\text{m}^{\frac{2}{3}}\right) \cdot \left(0.25^{\frac{1}{2}}\right)}{11.96\,\text{m/s}}$$

13) Radius of Pipe given Head loss by Manning Formula Formula

Evaluate Formula

Formula

$$R = \left(\frac{Lp_, \cdot \left(n \cdot v_f\right)^{2}}{0.157 \cdot h_f \cdot (2)^{\frac{4}{3}}}\right)^{\frac{3}{4}}$$

Example with Units

$$203.3607\,\text{mm} = \left(\frac{4.90\,\text{m} \cdot \left(0.009 \cdot 11.96\,\text{m/s}\right)^{2}}{0.157 \cdot 1.2\,\text{m} \cdot (2)^{\frac{4}{3}}}\right)^{\frac{3}{4}}$$

14) Radius of Pipe given Velocity of Flow in Pipe by Manning Formula Formula

Evaluate Formula

Formula

$$R_h = \left(\frac{v_f \cdot n}{S^{\frac{1}{2}}}\right)^{\frac{3}{2}}$$

Example with Units

$$0.0999\,\text{m} = \left(\frac{11.96\,\text{m/s} \cdot 0.009}{0.25^{\frac{1}{2}}}\right)^{\frac{3}{2}}$$

15) Velocity of Flow in Pipe by Manning Formula Formula

Evaluate Formula

Formula

$$v_f = \left(\frac{1}{n}\right) \cdot \left(R_h^{\frac{2}{3}}\right) \cdot \left(S^{\frac{1}{2}}\right)$$

Example with Units

$$11.9691\,\text{m/s} = \left(\frac{1}{0.009}\right) \cdot \left(0.10\,\text{m}^{\frac{2}{3}}\right) \cdot \left(0.25^{\frac{1}{2}}\right)$$

16) Velocity of Flow in Pipe by Manning Formula given Diameter Formula

Evaluate Formula

Formula

$$v_f = \left(\frac{0.397}{n}\right) \cdot \left(D_p^{\frac{2}{3}}\right) \cdot \left(S^{\frac{1}{2}}\right)$$

Example with Units

$$11.9736\,\text{m/s} = \left(\frac{0.397}{0.009}\right) \cdot \left(0.4\,\text{m}^{\frac{2}{3}}\right) \cdot \left(0.25^{\frac{1}{2}}\right)$$

17) Velocity of Flow in Pipe by Manning Formula given Radius of Pipe Formula

Evaluate Formula

Formula

$$v_f = \sqrt{\frac{h_f \cdot 0.157 \cdot \left(2 \cdot R\right)^{\frac{4}{3}}}{Lp_{,} \cdot n^2}}$$

Example with Units

$$11.8279\,\text{m/s} = \sqrt{\frac{1.2\,\text{m} \cdot 0.157 \cdot \left(2 \cdot 200\,\text{mm}\right)^{\frac{4}{3}}}{4.90\,\text{m} \cdot 0.009^2}}$$

18) Velocity of Flow in Pipe given Head loss by Manning Formula Formula

Evaluate Formula

Formula

$$v_f = \sqrt{\frac{h_f \cdot 0.157 \cdot D_p^{\frac{4}{3}}}{L_p \cdot n^2}}$$

Example with Units

$$16.559\,\text{m/s} = \sqrt{\frac{1.2\,\text{m} \cdot 0.157 \cdot 0.4\,\text{m}^{\frac{4}{3}}}{2.5\,\text{m} \cdot 0.009^2}}$$

Variables used in list of Manning's Formula above

- D_p Diameter of Pipe *(Meter)*
- h_f Head Loss *(Meter)*
- L_p Length of Pipe *(Meter)*
- $Lp_,$ Pipe Length *(Meter)*
- **n** Manning Coefficient
- **R** Pipe Radius *(Millimeter)*
- R_h Hydraulic Radius *(Meter)*
- **S** Hydraulic Gradient
- v_f Flow Velocity *(Meter per Second)*

Constants, Functions, Measurements used in list of Manning's Formula above

- 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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