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Roughness Coefficient Formulas

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List of 12 Roughness Coefficient Formulas

Roughness Coefficient

Roughness Coefficient for Full Flow

1) Roughness Coefficient for Full Flow given Discharge Ratio

Open Calculator

fx $$N = n_p \cdot \left(\frac{qsQ_{ratio}}{\left(\frac{a}{A}\right) \cdot \left(\frac{r_{pf}}{R_{rf}}\right)^{\frac{1}{6}}} \right)$$

ex $$0.737745 = 0.9 \cdot \left(\frac{0.532}{\left(\frac{3.8m^2}{5.4m^2}\right) \cdot \left(\frac{3.2m}{5.2m}\right)^{\frac{1}{6}}} \right)$$

2) Roughness Coefficient for Full Flow given Hydraulic Mean Depth and Discharge Ratio

Open Calculator

fx $$N = n_p \cdot \left(\frac{qsQ_{ratio}}{\left(\frac{a}{A}\right) \cdot (R)^{\frac{1}{6}}} \right)$$

ex $$0.738827 = 0.9 \cdot \left(\frac{0.532}{\left(\frac{3.8m^2}{5.4m^2}\right) \cdot (0.61)^{\frac{1}{6}}} \right)$$

3) Roughness Coefficient for Full Flow given Hydraulic Mean Depth and Velocity Ratio

Open Calculator

fx $$N = \left(\frac{\nu s V_{ratio}}{(R)^{\frac{1}{6}}} \right) \cdot n_p$$

ex $$0.742736 = \left(\frac{0.76}{(0.61)^{\frac{1}{6}}} \right) \cdot 0.9$$

4) Roughness Coefficient for Full Flow given Hydraulic Mean Depth Ratio

Open Calculator

fx $$N = \left(\frac{\left(\frac{V_s}{V} \right)}{(R)^{\frac{1}{6}}} \right) \cdot n_p$$

ex $$0.748005 = \left(\frac{\left(\frac{4.6 m/s}{6.01 m/s} \right)}{(0.61)^{\frac{1}{6}}} \right) \cdot 0.9$$

5) Roughness Coefficient for Full Flow given Self Cleansing Velocity

Open Calculator

fx $$N = n_p \cdot \left(\frac{\frac{V_s}{V}}{\left(\frac{r_{pf}}{R_{rf}}\right)^{\frac{2}{3}} \cdot \sqrt{S}} \right)$$

ex $$0.709673 = 0.9 \cdot \left(\frac{\frac{4.6\text{m/s}}{6.01\text{m/s}}}{\left(\frac{3.2\text{m}}{5.2\text{m}}\right)^{\frac{2}{3}} \cdot \sqrt{1.8}} \right)$$

6) Roughness Coefficient for Full Flow given Velocity Ratio

Open Calculator

fx $$N = n_p \cdot \left(\frac{vsV_{ratio}}{\left(\frac{r_{pf}}{R_{rf}}\right)^{\frac{2}{3}} \cdot \sqrt{S}} \right)$$

ex $$0.704675 = 0.9 \cdot \left(\frac{0.76}{\left(\frac{3.2\text{m}}{5.2\text{m}}\right)^{\frac{2}{3}} \cdot \sqrt{1.8}} \right)$$

Roughness Coefficient for Partial Flow

7) Roughness Coefficient for Partial Flow given Discharge Ratio

Open Calculator

fx
$$n_p = \frac{N}{\frac{qsQ_{ratio}}{\left(\frac{a}{A}\right)\cdot\left(\frac{r_{pf}}{R_{rf}}\right)^{\frac{1}{6}}}}$$

ex
$$0.90275 = \frac{0.74}{\frac{0.532}{\left(\frac{3.8m^2}{5.4m^2}\right)\cdot\left(\frac{3.2m}{5.2m}\right)^{\frac{1}{6}}}}$$

8) Roughness Coefficient for Partial Flow given Hydraulic Mean Depth and Discharge Ratio

Open Calculator

fx
$$n_p = \frac{N}{\frac{qsQ_{ratio}}{\left(\frac{a}{A}\right)\cdot(R)^{\frac{1}{6}}}}$$

ex
$$0.901429 = \frac{0.74}{\frac{0.532}{\left(\frac{3.8m^2}{5.4m^2}\right)\cdot(0.61)^{\frac{1}{6}}}}$$

9) Roughness Coefficient for Partial Flow given Hydraulic Mean Depth and Velocity Ratio

Open Calculator

fx $$n_p = \frac{N}{\frac{vs V_{ratio}}{(R)^{\frac{1}{6}}}}$$

ex $$0.896685 = \frac{0.74}{\frac{0.76}{(0.61)^{\frac{1}{6}}}}$$

10) Roughness Coefficient for Partial Flow given Hydraulic Mean Depth Ratio

Open Calculator

fx $$n_p = \frac{N}{\frac{\frac{V_s}{V}}{(R)^{\frac{1}{6}}}}$$

ex $$0.890369 = \frac{0.74}{\frac{\frac{4.6\text{m/s}}{6.01\text{m/s}}}{(0.61)^{\frac{1}{6}}}}$$

11) Roughness Coefficient for Partial Flow given Self Cleansing Velocity

Open Calculator

fx $$n_p = \frac{N}{\frac{V_s}{V}\cdot\left(\frac{r_{pf}}{R_{rf}}\right)^{\frac{2}{3}}\cdot\sqrt{S}}$$

ex $$0.93846 = \frac{0.74}{\frac{4.6\text{m/s}}{6.01\text{m/s}}\cdot\left(\frac{3.2\text{m}}{5.2\text{m}}\right)^{\frac{2}{3}}\cdot\sqrt{1.8}}$$

12) Roughness Coefficient for Partial Flow given Velocity Ratio

Open Calculator

fx $$n_p = \frac{N}{vsV_{ratio}\cdot\left(\frac{r_{pf}}{R_{rf}}\right)^{\frac{2}{3}}\cdot\sqrt{S}}$$

ex $$0.945117 = \frac{0.74}{0.76\cdot\left(\frac{3.2\text{m}}{5.2\text{m}}\right)^{\frac{2}{3}}\cdot\sqrt{1.8}}$$

Variables Used

- **a** Area of Partially Full Sewers *(Square Meter)*
- **A** Area of Running Full Sewers *(Square Meter)*
- **N** Roughness Coefficient for Running Full
- n_p Roughness Coefficient Partially Full
- qsQ_{ratio} Discharge Ratio
- **R** Hydraulic Mean Depth Ratio
- r_{pf} Hydraulic Mean Depth for Partially Full *(Meter)*
- R_{rf} Hydraulic Mean Depth while Running Full *(Meter)*
- **S** Bed Slope Ratio
- **V** Velocity While Running Full *(Meter per Second)*
- V_s Velocity in a Partially Running Sewer *(Meter per Second)*
- vsV_{ratio} Velocity Ratio

Constants, Functions, Measurements used

- 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)
  Length Unit Conversion
- Measurement: **Area** in Square Meter (m²)
  Area Unit Conversion
- Measurement: **Speed** in Meter per Second (m/s)
  Speed Unit Conversion

Check other formula lists

- **Flow Velocity in Sewers and Drains Formulas**
- **Hydraulic Mean Depth Formulas**
- **Minimum Velocity to be Generated in Sewers Formulas**
- **Proportionate Hydraulic Elements for Circular Sewers Formulas**
- **Roughness Coefficient Formulas**

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8/27/2024 | 8:53:00 AM UTC

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