Important Circular Sewer Section Running Partially Full Formulas PDF

Formulas
Examples
with Units

List of 11
Important Circular Sewer Section Running Partially Full Formulas

1) Area of Cross-Section while Running Partially Full given Discharge Formula

Evaluate Formula

Formula

$$a = \frac{q}{V_s}$$

Example with Units

$$3.8\,\text{m}^2 = \frac{17.48\,\text{m}^3/\text{s}}{4.6\,\text{m/s}}$$

2) Area of Cross-section while Running Partially Full given Proportionate Area Formula

Evaluate Formula

Formula

$$a = P_a \cdot A$$

Example with Units

$$3.7962\,\text{m}^2 = 0.703 \cdot 5.4\,\text{m}^2$$

3) Area of Cross-section while Running Partially Full given Proportionate Discharge Formula

Evaluate Formula

Formula

$$a = \frac{P_q \cdot V \cdot A}{V_s}$$

Example with Units

$$3.7957\,\text{m}^2 = \frac{0.538 \cdot 6.01\,\text{m/s} \cdot 5.4\,\text{m}^2}{4.6\,\text{m/s}}$$

4) Discharge when Pipe Running Partially Full Formula

Evaluate Formula

Formula

$$q = a \cdot V_s$$

Example with Units

$$17.48\,\text{m}^3/\text{s} = 3.8\,\text{m}^2 \cdot 4.6\,\text{m/s}$$

5) Discharge when Pipe Running Partially Full using Proportionate Discharge Formula

Evaluate Formula

Formula

$$q = \left(P_q \cdot Q \right)$$

Example with Units

$$17.485\,\text{m}^3/\text{s} = \left(0.538 \cdot 32.5\,\text{m}^3/\text{s} \right)$$

6) Hydraulic Mean Depth while Running Partially Full given Proportionate Hydraulic Mean Depth Formula

Evaluate Formula

Formula

$$r_{pf} = R_{rf} \cdot P_{hmd}$$

Example with Units

$$3.198\,\text{m} = 5.2\,\text{m} \cdot 0.615$$

7) Hydraulic Mean Depth while Running Partially Full given Proportionate Velocity Formula

Evaluate Formula

Formula

$$r_{pf} = \left(\frac{P_v \cdot n_p \cdot \left(R_{rf} \right)^{\frac{2}{3}}}{N} \right)^{\frac{3}{2}}$$

Example with Units

$$4.6667\,\text{m} = \left(\frac{0.765 \cdot 0.9 \cdot \left(5.2\,\text{m} \right)^{\frac{2}{3}}}{0.74} \right)^{\frac{3}{2}}$$

8) Roughness Coefficient while Running Partially Full using Proportionate Velocity Formula

Evaluate Formula

Formula

$$n_p = \left(\frac{N}{P_v} \right) \cdot \left(\frac{r_{pf}}{R_{rf}} \right)^{\frac{2}{3}}$$

Example with Units

$$0.6998 = \left(\frac{0.74}{0.765} \right) \cdot \left(\frac{3.2\,\text{m}}{5.2\,\text{m}} \right)^{\frac{2}{3}}$$

9) Velocity while Running Partially Full given Discharge Formula

Evaluate Formula

Formula

$$V_s = \frac{q}{a}$$

Example with Units

$$4.6\,\text{m/s} = \frac{17.48\,\text{m}^3\text{/s}}{3.8\,\text{m}^2}$$

10) Velocity while Running Partially Full given Proportionate Discharge Formula

Evaluate Formula

Formula

$$V_s = \frac{P_q \cdot V \cdot A}{a}$$

Example with Units

$$4.5948\,\text{m/s} = \frac{0.538 \cdot 6.01\,\text{m/s} \cdot 5.4\,\text{m}^2}{3.8\,\text{m}^2}$$

11) Velocity while Running Partially Full given Proportionate Velocity Formula

Evaluate Formula

Formula

$$V_s = V \cdot P_v$$

Example with Units

$$4.5976\,\text{m/s} = 6.01\,\text{m/s} \cdot 0.765$$

Variables used in list of Circular Sewer Section Running Partially Full Formulas above

- **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
- P_a Proportionate Area
- P_{hmd} Proportionate Hydraulic Mean Depth
- P_q Proportionate Discharge
- P_v Proportionate Velocity
- **q** Discharge when Pipe is Running Partially Full *(Cubic Meter per Second)*
- **Q** Discharge when Pipe is Running Full *(Cubic Meter per Second)*
- r_{pf} Hydraulic Mean Depth for Partially Full *(Meter)*
- R_{rf} Hydraulic Mean Depth while Running Full *(Meter)*
- **V** Velocity While Running Full *(Meter per Second)*
- V_s Velocity in a Partially Running Sewer *(Meter per Second)*

Constants, Functions, Measurements used in list of Circular Sewer Section Running Partially Full Formulas above

- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Area** in Square Meter (m^2)
  Area Unit Conversion
- Measurement: **Speed** in Meter per Second (m/s)
  Speed Unit Conversion
- Measurement: **Volumetric Flow Rate** in Cubic Meter per Second (m^3/s)
  Volumetric Flow Rate Unit Conversion

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