Important Design of an Aerated Grit Chamber Formulas PDF

Formulas
Examples
with Units

List of 16
Important Design of an Aerated Grit Chamber Formulas

1) Air Supply required in Grit Chamber Formula

Evaluate Formula

Formula

$$A_s = \frac{A}{L}$$

Example with Units

$$0.0077\,\text{m}^3/\text{s} = \frac{0.053\,\text{m}^2/\text{s}}{6.92\,\text{m}}$$

2) Assumed Grit Quantity given Volume of Grit Formula

Evaluate Formula

Formula

$$Q_g = \frac{V_g}{V}$$

Example with Units

$$25 = \frac{500\,\text{m}^3}{20}$$

3) Chamber Length using Air Supply required Formula

Evaluate Formula

Formula

$$L = \left(\frac{A}{A_s}\right)$$

Example with Units

$$6.9737\,\text{m} = \left(\frac{0.053\,\text{m}^2/\text{s}}{0.0076\,\text{m}^3/\text{s}}\right)$$

4) Chosen Air Supply given Air Supply required Formula

Evaluate Formula

Formula

$$A = A_s \cdot L$$

Example with Units

$$0.0526\,\text{m}^2/\text{s} = 0.0076\,\text{m}^3/\text{s} \cdot 6.92\,\text{m}$$

5) Chosen Depth given Width of Grit Chamber Formula

Evaluate Formula

Formula

$$D = \frac{W}{R}$$

Example with Units

$$2.5243\,\text{m} = \frac{2.6\,\text{m}}{1.03}$$

6) Depth given Length of Grit Chamber Formula

Evaluate Formula

Formula

$$D = \left(\frac{V_T}{L \cdot W}\right)$$

Example with Units

$$2.5011\,\text{m} = \left(\frac{45\,\text{m}^3}{6.92\,\text{m} \cdot 2.6\,\text{m}}\right)$$

7) Detention Time given Volume of Each Grit Chamber Formula

Evaluate Formula

Formula

$$T_d = \frac{V_T}{Q_p}$$

Example with Units

$$3\,\text{min} = \frac{45\,\text{m}^3}{0.25\,\text{m}^3/\text{s}}$$

8) Length of Grit Chamber Formula

Evaluate Formula

Formula

$$L = \left(\frac{V_T}{W \cdot D}\right)$$

Example with Units

$$6.9203\,\text{m} = \left(\frac{45\,\text{m}^3}{2.6\,\text{m} \cdot 2.501\,\text{m}}\right)$$

9) Peak Flow Rate given Volume of Each Grit Chamber Formula

Evaluate Formula

Formula

$$Q_p = \frac{V_T}{T_d}$$

Example with Units

$$0.25\,\text{m}^3/\text{s} = \frac{45\,\text{m}^3}{3\,\text{min}}$$

10) Selected Width-Ratio given Width of Grit Chamber Formula

Evaluate Formula

Formula

$$R = \frac{W}{D}$$

Example with Units

$$1.0396 = \frac{2.6\,\text{m}}{2.501\,\text{m}}$$

11) Volume Flow Rate given Volume of Grit Formula

Evaluate Formula

Formula

$$V = \frac{V_g}{Q_g}$$

Example with Units

$$20 = \frac{500\,\text{m}^3}{25}$$

12) Volume of Each Grit Chamber Formula

Evaluate Formula

Formula

$$V_T = \left(Q_p \cdot T_d\right)$$

Example with Units

$$45\,\text{m}^3 = \left(0.25\,\text{m}^3/\text{s} \cdot 3\,\text{min}\right)$$

13) Volume of Grit Formula

Evaluate Formula

Formula

$$V_g = Q_g \cdot V$$

Example with Units

$$500\,\text{m}^3 = 25 \cdot 20$$

14) Volume of Grit Chamber given Length of Grit Chamber Formula

Evaluate Formula

Formula

$$V_T = \left(L \cdot W \cdot D\right)$$

Example with Units

$$44.998\,\text{m}^3 = \left(6.92\,\text{m} \cdot 2.6\,\text{m} \cdot 2.501\,\text{m}\right)$$

15) Width of Grit Chamber Formula

Evaluate Formula

Formula

$$W = (R \cdot D)$$

Example with Units

$$2.576\,\text{m} = (1.03 \cdot 2.501\,\text{m})$$

16) Width using Length of Grit Chamber Formula

Evaluate Formula

Formula

$$W = \left(\frac{V_T}{D \cdot L} \right)$$

Example with Units

$$2.6001\,\text{m} = \left(\frac{45\,\text{m}^3}{2.501\,\text{m} \cdot 6.92\,\text{m}} \right)$$

Variables used in list of Design of an Aerated Grit Chamber Formulas above

- **A** Chosen Air Supply *(Square Meter per Second)*
- A_s Air Supply Required *(Cubic Meter per Second)*
- **D** Depth of Grit Chamber *(Meter)*
- **L** Length of Grit Chamber *(Meter)*
- Q_g Assumed Grit Quantity in Cubic Meter per MLD
- Q_p Peak Flow Rate *(Cubic Meter per Second)*
- **R** Selected Width Ratio
- T_d Detention Time *(Minute)*
- **V** Volumetric Flow Rate in Million Litres per Day
- V_g Volume of Grit *(Cubic Meter)*
- V_T Volume of Grit Chamber *(Cubic Meter)*
- **W** Width of Grit Chamber *(Meter)*

Constants, Functions, Measurements used in list of Design of an Aerated Grit Chamber Formulas above

- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Time** in Minute (min)
  Time Unit Conversion
- Measurement: **Volume** in Cubic Meter (m^3)
  Volume Unit Conversion
- Measurement: **Volumetric Flow Rate** in Cubic Meter per Second (m^3/s)
  Volumetric Flow Rate Unit Conversion
- Measurement: **Kinematic Viscosity** in Square Meter per Second (m^2/s)
  Kinematic Viscosity Unit Conversion

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