Important Geometrical Properties of Rectangular Channel Section Formulas PDF

Formulas
Examples
with Units

List of 12
Important Geometrical Properties of Rectangular Channel Section Formulas

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1) Depth of Flow given Hydraulic Radius in Rectangle Formula 📲

Formula

$$D_f = B_{rect} \cdot \frac{R_{H(rect)}}{B_{rect} - 2 \cdot R_{H(rect)}}$$

Example with Units

$$5.2\,\text{m} = 10.4\,\text{m} \cdot \frac{2.6\,\text{m}}{10.4\,\text{m} - 2 \cdot 2.6\,\text{m}}$$

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2) Depth of Flow given Section Factor for Rectangle Channel Formula 📲

Formula

$$D_f = \left(\frac{Z_{rect}}{B_{rect}} \right)^{\frac{2}{3}}$$

Example with Units

$$5.2\,\text{m} = \left(\frac{123.32\,\text{m\textasciicircum2.5}}{10.4\,\text{m}} \right)^{\frac{2}{3}}$$

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3) Depth of Flow given Wetted Area for Rectangle Formula 📲

Formula

$$D_f = \frac{A_{rect}}{B_{rect}}$$

Example with Units

$$5.2\,\text{m} = \frac{54.08\,\text{m}^2}{10.4\,\text{m}}$$

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4) Depth of Flow given Wetted Perimeter for Rectangle Formula 📲

Formula

$$D_f = \left(P_{rect} - B_{rect} \right) \cdot 0.5$$

Example with Units

$$5.2\,\text{m} = \left(20.8\,\text{m} - 10.4\,\text{m} \right) \cdot 0.5$$

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5) Hydraulic Radius of Open Channel Formula 📲

Formula

$$R_{H(rect)} = \frac{B_{rect} \cdot D_f}{B_{rect} + 2 \cdot D_f}$$

Example with Units

$$2.6\,\text{m} = \frac{10.4\,\text{m} \cdot 5.2\,\text{m}}{10.4\,\text{m} + 2 \cdot 5.2\,\text{m}}$$

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6) Section Factor for Rectangle Formula 📲

Formula

$$Z_{rect} = B_{rect} \cdot D_f^{1.5}$$

Example with Units

$$123.3214\,\text{m\textasciicircum2.5} = 10.4\,\text{m} \cdot 5.2\,\text{m}^{1.5}$$

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7) Wetted Area for Rectangle Formula ↱

Formula

$$A_{rect} = B_{rect} \cdot D_f$$

Example with Units

$$54.08\,\text{m}^2 = 10.4\,\text{m} \cdot 5.2\,\text{m}$$

8) Wetted Perimeter for Rectangular Section Formula ↱

Formula

$$P_{rect} = B_{rect} + 2 \cdot D_f$$

Example with Units

$$20.8\,\text{m} = 10.4\,\text{m} + 2 \cdot 5.2\,\text{m}$$

9) Width of Section given Hydraulic Radius of Rectangle Formula ↱

Formula

$$B_{rect} = \frac{2 \cdot R_{H(rect)} \cdot D_f}{D_f - R_{H(rect)}}$$

Example with Units

$$10.4\,\text{m} = \frac{2 \cdot 2.6\,\text{m} \cdot 5.2\,\text{m}}{5.2\,\text{m} - 2.6\,\text{m}}$$

10) Width of Section given Perimeter Formula ↱

Formula

$$B_{rect} = P_{rect} - 2 \cdot D_f$$

Example with Units

$$10.4\,\text{m} = 20.8\,\text{m} - 2 \cdot 5.2\,\text{m}$$

11) Width of Section given Section Factor Formula ↱

Formula

$$B_{rect} = \frac{Z_{rect}}{D_f^{1.5}}$$

Example with Units

$$10.3999\,\text{m} = \frac{123.32\,\text{m\textasciicircum2.5}}{5.2\,\text{m}^{1.5}}$$

12) Width of Section given Wetted Areas Formula ↱

Formula

$$B_{rect} = \frac{A_{rect}}{D_f}$$

Example with Units

$$10.4\,\text{m} = \frac{54.08\,\text{m}^2}{5.2\,\text{m}}$$

Variables used in list of Geometrical Properties of Rectangular Channel Section Formulas above

- **A_{rect}** Wetted Surface Area of Rectangle *(Square Meter)*
- **B_{rect}** Width of Section of Rect Channel *(Meter)*
- **D_f** Depth of Flow of Channel *(Meter)*
- **P_{rect}** Wetted Perimeter of Rectangle *(Meter)*
- **$R_{H(rect)}$** Hydraulic Radius of Rectangle *(Meter)*
- **Z_{rect}** Section Factor of Rectangle *(Meter^2.5)*

Constants, Functions, Measurements used in list of Geometrical Properties of Rectangular Channel Section Formulas above

- Measurement: **Length** in Meter (m)
  Length Unit Conversion ➤
- Measurement: **Area** in Square Meter (m²)
  Area Unit Conversion ➤
- Measurement: **Section Factor** in Meter^2.5 (m^2.5)
  Section Factor Unit Conversion ➤

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