calculatoratoz.com

unitsconverters.com

Hydroelectric Power Generation Formulas

Calculators! Examples! Conversions!

Bookmark **calculatoratoz.com**, **unitsconverters.com**

Widest Coverage of Calculators and Growing - **30,000+ Calculators!**
Calculate With a Different Unit for Each Variable - **In built Unit Conversion!**
Widest Collection of Measurements and Units - **250+ Measurements!**

Feel free to SHARE this document with your friends!

Please leave your feedback here...

List of 15 Hydroelectric Power Generation Formulas

Hydroelectric Power Generation

1) Flow Rate for Power obtained from Water Flow in Horsepower

Open Calculator

fx $$Q_t = \frac{P \cdot 8.8}{\eta \cdot H}$$

ex $$0.460194\text{m}^3/\text{s} = \frac{170\text{W} \cdot 8.8}{14 \cdot 232.2\text{m}}$$

2) Flow Rate given Power in Kilowatt

Open Calculator

fx $$Q_t = \frac{P \cdot 11.8}{\eta \cdot H}$$

ex $$0.617079\text{m}^3/\text{s} = \frac{170\text{W} \cdot 11.8}{14 \cdot 232.2\text{m}}$$

3) Flow Rate given Power obtained from Water Flow in Horsepower

Open Calculator

fx $$F = \frac{P \cdot 550}{\eta \cdot H \cdot \gamma_w}$$

ex $$0.002932\text{m}^3/\text{s} = \frac{170\text{W} \cdot 550}{14 \cdot 232.2\text{m} \cdot 9.81\text{kN/m}^3}$$

4) Flow Rate given Power obtained from Water Flow in Kilowatt

Open Calculator

$$F = \frac{P \cdot 738}{\eta \cdot H \cdot \gamma_w}$$

$$0.003934\text{m}^3/\text{s} = \frac{170\text{W} \cdot 738}{14 \cdot 232.2\text{m} \cdot 9.81\text{kN/m}^3}$$

5) Potential Energy of Volume of Water in Hydroelectric Power Generation

Open Calculator

$$PE = \gamma_w \cdot h$$

$$117.72\text{J} = 9.81\text{kN/m}^3 \cdot 12\text{m}$$

6) Total Weight of Water given Potential Energy in Hydroelectric Power Generation

Open Calculator

$$\gamma_w = \frac{PE}{h}$$

$$9.766667\text{kN/m}^3 = \frac{117.2\text{J}}{12\text{m}}$$

Effective Head

7) Effective Head for Power in Kilowatt

Open Calculator

fx $$H = \frac{P \cdot 11.8}{Q_t \cdot \eta}$$

ex $$311.4907\text{m} = \frac{170\text{W} \cdot 11.8}{0.46\text{m}^3/\text{s} \cdot 14}$$

8) Effective Head for Power obtained from Water Flow in Horsepower

Open Calculator

fx $$H = \frac{P \cdot 8.8}{Q_t \cdot \eta}$$

ex $$232.2981\text{m} = \frac{170\text{W} \cdot 8.8}{0.46\text{m}^3/\text{s} \cdot 14}$$

Efficiency of Turbine

9) Efficiency of Turbine and Generator for Power obtained from Water Flow in Horsepower

Open Calculator

fx $$\eta = \frac{P \cdot 8.8}{Q_t \cdot H}$$

ex $$14.00592 = \frac{170\text{W} \cdot 8.8}{0.46\text{m}^3/\text{s} \cdot 232.2\text{m}}$$

10) Efficiency of Turbine and Generator given Power in Kilowatt

Open Calculator

$$\eta = \frac{P \cdot 11.8}{Q_t \cdot H}$$

$$18.78066 = \frac{170\text{W} \cdot 11.8}{0.46\text{m}^3/\text{s} \cdot 232.2\text{m}}$$

11) Efficiency of Turbine and Generator given Power obtained from Water Flow in Horsepower

Open Calculator

$$\eta = \frac{P \cdot 550}{Q_t \cdot H \cdot \gamma_w}$$

$$89.2324 = \frac{170\text{W} \cdot 550}{0.46\text{m}^3/\text{s} \cdot 232.2\text{m} \cdot 9.81\text{kN/m}^3}$$

12) Efficiency of turbine and generator given Power obtained from water flow in Kilowatt

Open Calculator

$$\eta = \frac{P \cdot 738}{F \cdot H \cdot \gamma_w}$$

$$11.0155 = \frac{170\text{W} \cdot 738}{0.005\text{m}^3/\text{s} \cdot 232.2\text{m} \cdot 9.81\text{kN/m}^3}$$

Power obtained from Water Flow

13) Power obtained from Water Flow in Horsepower

Open Calculator

fx $$P = \frac{\eta \cdot Q_t \cdot H \cdot \gamma_w}{550}$$

ex $$26.67193\text{W} = \frac{14 \cdot 0.46\text{m}^3/\text{s} \cdot 232.2\text{m} \cdot 9.81\text{kN/m}^3}{550}$$

14) Power obtained from Water Flow in Kilowatt

Open Calculator

fx $$P = \frac{H \cdot Q_t \cdot H \cdot \gamma_w}{738}$$

ex $$329.6818\text{W} = \frac{232.2\text{m} \cdot 0.46\text{m}^3/\text{s} \cdot 232.2\text{m} \cdot 9.81\text{kN/m}^3}{738}$$

15) Power obtained from Water Flow in Kilowatt given Effective Head

Open Calculator

fx $$P = \frac{\eta \cdot Q_t \cdot H}{11.8}$$

ex $$126.7261\text{W} = \frac{14 \cdot 0.46\text{m}^3/\text{s} \cdot 232.2\text{m}}{11.8}$$

Variables Used

- **F** Flow rate *(Cubic Meter per Second)*
- **h** Vertical Distance Water can Fall *(Meter)*
- **H** Effective Head *(Meter)*
- **P** Hydroelectric Power *(Watt)*
- **PE** Potential Energy *(Joule)*
- Q_t Discharge from Dam *(Cubic Meter per Second)*
- γ_w Unit Weight of Water *(Kilonewton per Cubic Meter)*
- η Efficiency of Turbine

Constants, Functions, Measurements used

- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Energy** in Joule (J)
  Energy Unit Conversion
- Measurement: **Power** in Watt (W)
  Power Unit Conversion
- Measurement: **Volumetric Flow Rate** in Cubic Meter per Second (m^3/s)
  Volumetric Flow Rate Unit Conversion
- Measurement: **Specific Weight** in Kilonewton per Cubic Meter (kN/m^3)
  Specific Weight Unit Conversion

Check other formula lists

- Buoyancy And Floatation Formulas
- Culverts Formulas
- Equations of Motion and Energy Equation Formulas
- Flow of Compressible Fluids Formulas
- Flow Over Notches and Weirs Formulas
- Fluid Pressure and Its Measurement Formulas
- Fundamentals of Fluid Flow Formulas
- Hydroelectric Power Generation Formulas
- Hydrostatic Forces on Surfaces Formulas
- Impact of Free Jets Formulas
- Impulse Momentum Equation and its Applications Formulas
- Liquids in Relative Equilibrium Formulas
- Most Economical or Most Efficient Section of Channel Formulas
- Non-uniform Flow in Channels Formulas
- Properties of Fluid Formulas
- Thermal Expansion of Pipe and Pipe Stresses Formulas
- Uniform Flow in Channels Formulas
- Water Power Engineering Formulas

Feel free to SHARE this document with your friends!

PDF Available in

English Spanish French German Russian Italian Portuguese Polish Dutch

2/1/2024 | 4:43:52 AM UTC

Please leave your feedback here...