

Pump Power and System Head

Sample document with complete example values. It shows the report the purchased export produces for YOUR input - it is not itself a report for any part.

Project: Sample project

Part/Position: no real part

Prepared by: Sample, not released

Sizing via $P_{\text{hyd}} = \rho \cdot g \cdot Q \cdot H$ and $P_{\text{shaft}} = P_{\text{hyd}} / \eta_P$. Flow rate $Q = 50 \text{ m}^3/\text{h} = 13.889 \text{ l/s}$, system head $H = 30 \text{ m}$, density $\rho = 1,000 \text{ kg/m}^3$. Result: $P_{\text{hyd}} = 4,088 \text{ W} = 4.088 \text{ kW}$, $P_{\text{shaft}} = 5,450 \text{ W} = 5.45 \text{ kW}$.

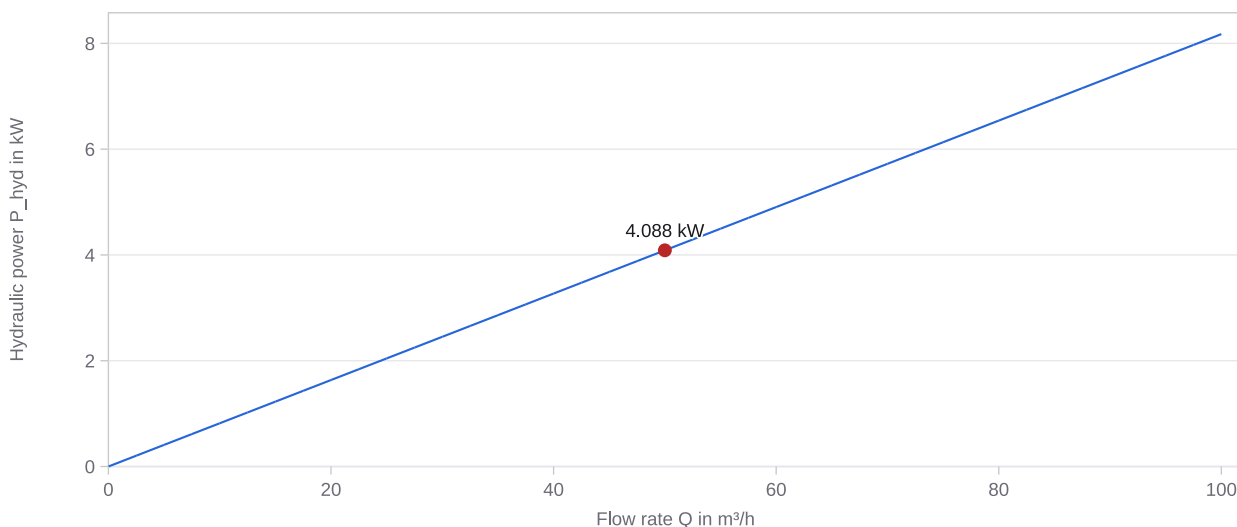
Operating Data

Flow rate Q	50 m³/h
Flow rate Q	13.889 l/s
System head H	30 m
Density ρ	1,000 kg/m³
Pump efficiency η_P	0.75

Power

Hydraulic power P_{hyd}	4,088 W
Hydraulic power P_{hyd}	4.088 kW
Shaft power P_{shaft}	5,450 W
Shaft power P_{shaft}	5.45 kW

Hydraulic power over flow rate at constant head



Calculation basis

The system head follows from $H_A = H_{\text{geo}} + \Delta p / (\rho \cdot g) + H_v$, where $\Delta p = p_a - p_e$ is the pressure difference between the outlet and inlet cross-section (the velocity head is neglected for simplicity). The hydraulic power delivered is $P_{\text{hyd}} = \rho \cdot g \cdot Q \cdot H$. The pump efficiency gives the shaft power required at the coupling, $P_{\text{shaft}} = P_{\text{hyd}} / \eta_P$, and the motor efficiency gives the electrical motor power $P_{\text{motor}} = P_{\text{shaft}} / \eta_{\text{motor}}$. This is a sizing calculator without cavitation (NPSH) or strength verification; $g = 9.81 \text{ m/s}^2$.

About this sample

All values on these pages come from a freely chosen example calculation and belong to no real part. The purchased export contains the same sections with your input, your header data (project, part, prepared by) and as searchable text. Pricing and scope: maschinenbaurechner.de/en/pricing



Note: The results are design and orientation aids. They do not replace independent verification, calculation and approval by a qualified person. The terms of use at maschinenbaurechner.de apply.