

Flow Rate and Turnover Guide

PCG-NB-001 | Calculations | Intended for: Designer

Use of this guide

Flow and turnover calculations help compare system options. They do not predict oxygen transfer, contaminant removal or treatment time by themselves. Water chemistry, biological loading, gas source, mixing, depth and circulation all affect performance.

Core calculations

Rectangular volume	Length x width x average depth = m3	Length x width x average depth = ft3; ft3 x 7.48052 = US gal
Circular volume	3.1416 x radius2 x average depth = m3	3.1416 x radius2 x average depth = ft3
Daily treated volume	Flow m3/h x operating hours	Flow US gpm x 60 x operating hours
Turnover time	Water volume / actual system flow	Water volume / actual system flow
Required flow	Water volume / target turnover hours	Water volume / target turnover hours

Example

A 1,200 m3 pond treated at an actual 20 m3/h for 12 hours per day receives 240 m3 of pump-throughput per day. The equivalent continuous turnover time at 20 m3/h is 60 hours. At 12 hours of operation per day, one calculated volume-equivalent requires five days. This is a hydraulic comparison only; it does not mean every water parcel is treated once or that a treatment objective will be reached in five days.

Pressure and head

- 1 psi is approximately 2.31 ft of water head.
- 1 bar is approximately 10.2 m of water head.
- Total dynamic head includes the nozzle pressure requirement, static elevation and losses through pipe, valves, fittings, filters and manifolds.
- Use the pump curve at the actual duty point. Motor horsepower or kilowatts alone do not establish suitable flow and pressure.

Information required for selection

- Water volume and dimensions
- Desired operating hours and treatment objective
- Nozzle model and required flow
- Static elevation and suction arrangement
- Pipe material, inside diameter and total length
- Number and type of fittings, valves, filters and discharge branches
- Available power, voltage, frequency and phase
- Gas source and required gas-line length

Calculation notice: These formulas support preliminary design. Puroxi must confirm final nozzle and pump compatibility before equipment is ordered or installed.