

CALIBRATION OF SAND MEDIA FILTER BACKWASH FLOWRATES

Introduction

Sand media filters clean irrigation water by trapping particles in the spaces between sharp-edged sand grains. Over time, these spaces fill up, reducing filter performance. To restore efficiency, the system must be backwashed by reversing the water flow. This process lifts the sand, allowing trapped particles to be flushed out. The key to effective cleaning is setting the backwash flowrate high enough to lift the sand but not so high that the sand is expelled from the tank.

Backwash Flowrate Calibration

Proper calibration of the backwash flowrate is essential for maintaining the filter system.

- If the flowrate is too low, the sand bed won't be cleaned properly, leading to clogging and stopping water flow.
- If the flowrate is too high, the filter media may be lost, exposing the system to contamination and potential failure.

Calibration Steps:

1. Start the system at operating pressure and flow.
2. Initiate a backwash cycle.
3. Observe the backwash flow through the sight glass (view tube) with the backwash inlet restrictor valve set to 1/4 open.
4. If no sand is visible, gradually open the restrictor valve until a slight amount of sand appears, then close it slightly until no sand is visible.
5. If sand is visible at the 1/4 open setting, close the restrictor valve slightly until the sand is no longer seen.
6. The backwash flowrate is now calibrated for that pressure and flowrate.





CALIBRATION OF SAND MEDIA FILTER BACKWASH FLOWRATES

Flush Control

Initial Settings

These starting values should be adjusted based on site conditions, water quality changes (e.g., rain runoff), and other factors to maintain optimal filter operation:

- **Backwash Period: Every 2 hours**
- **Backwash Length: 5 minutes**
- **P.D. (Pressure Differential) Switch Setting: 6–8 PSI**

Backwash Interval

The time between backwash cycles varies based on system load. Standard intervals range from every 2 to 24 hours, but heavy sediment loads may require backwashing every 15–20 minutes.

Flush Time

Each filter's backwash duration typically ranges from 4 to 10 minutes, depending on water quality and whether coagulants are used.

Backwash Cycle

A backwash cycle consists of back flush and surface wash times for each tank in the filter system. It can be initiated by:

- 1. Periodic scheduling**
- 2. Pressure differential switch activation**
- 3. External sources (refer to electrical schematic)**



CALIBRATION OF SAND MEDIA FILTER BACKWASH FLOWRATES

P.D. (Pressure Differential) Backwash

As filters accumulate debris, pressure between the inlet and discharge increases, reducing flow. When this difference reaches the P.D. switch's set pressure, a backwash cycle starts. After backwashing, a rinse cycle restores the filtration rate.

LCD Readouts

Modern backwash controllers often feature LCD readouts displaying:

- Total number of backwash cycles
- Time until the next backwash
- Number of times the P.D. switch has triggered backwash. These readouts assist with system monitoring and calibration, ensuring efficiency.

System Backwash Pressure Changes

Once the backwash inlet restrictor valve is properly set, system pressure changes can impact backwash flow:

- Small pressure variations may not require recalibration.
- Large pressure fluctuations may require a flow-regulating valve in the backwash line to maintain a consistent flowrate and maximize efficiency.

Sand media filters trap particles in porous sand beds. To maintain peak performance, backwashing is necessary to remove accumulated debris. *Key factors in filter efficiency include:*

1. Backwash flowrate

2. Flush time

3. Backwash interval Properly adjusting these ensures a more reliable and effective filtration system.

