FLOCELL XFM 900 FILTERS

INSTALLATION & OPERATING MANUAL

TERMS & CONDITIONS

PLEASE READ INSTRUCTIONS THOROUGHLY BEFORE INSTALLATION AND COMMISSIONING

Document Title	**Flocell XFM 900 Filter - Installation & Operation Manual**
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Contents

1. Introduction

Flocell XFM filters are high performance, high-capacity filtration units designed to capture large quantities of suspended particles and are not subject to the typical restrictions of particulate filters.

a. Low cleaning frequency

Due to much higher retention capacity, cleaning cycles are far less frequent than with other technologies therefore increasing operational efficiency.

b. No hydraulic pressure loss

XFM Filters do not suffer significant hydraulic loss and will continue to filter at low head until they reach retention capacity and require cleaning.

XFM filters can work under a gravity supply assuming the outlet line will run down the head gradient.

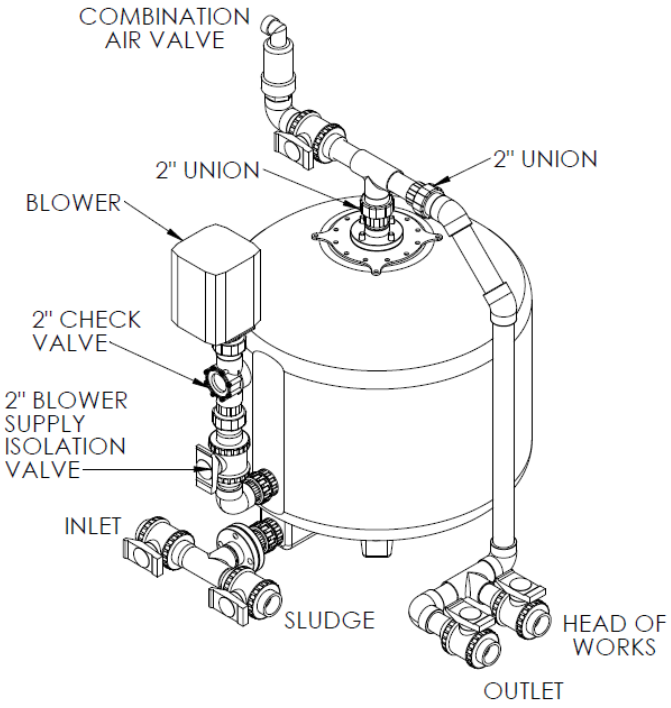
c. Low operating costs

XFM filters offer significantly lower operating costs due to reduced power and water usage. While they are not typically designed for absolute single-pass filtration, they operate by continuously removing a portion of the particles present in the water. In applications where single-pass filtration is required, multiple filters can be installed in series or parallel. Alternatively, a screened balancing tank or sump positioned after the filter allows for continuous filtration of the water body.

d. Low water use and air-cleaning

XFM filters are cleaned through a brief air sparging process, after which a single volume of concentrated filtrate is discharged as waste once the units have been isolated. To remove sludge from the filter, either a pumped or gravity-driven system is required.

2. Standard Supply



STANDARD SUPPLY

All customer connection points are 2" unless otherwise specified.

Standard Supplied Items

The following items are supplied as standard with the Flocell XFM 900 Filter:

Item	Description
Flocell XFM 900 Filter	Primary filtration unit constructed from HDPE for suspended solids removal
1000 litres XFM Fines Media	High-efficiency mechanical media for optimal filtration performance
Pipework and Ball Valves	As supplied (includes inlet, sludge, outlet, and head of works pipework and ball valves – see GA notes)
Air Delivery Manifold	For distribution of air during media cleaning cycles
2" Airline with Non-Return Valve	Airline assembly for air injection during backwash
AIRFLO 900W	Air blower for media agitation during cleaning cycles
2" Airline Isolation Valve	Valve for controlling airflow to the filter during cleaning

Note: All pipework and associated components—including inlet, sludge, outlet, and head of works ball valves—are supplied loose. It is the responsibility of the end user to assemble, position, glue, and connect these components on-site according to installation requirements. Additional installation materials (e.g. pipework and fittings) need to be provided by the customer.

Customer Connection Details

The following are the pipework connections the customer will need to connect to on-site:

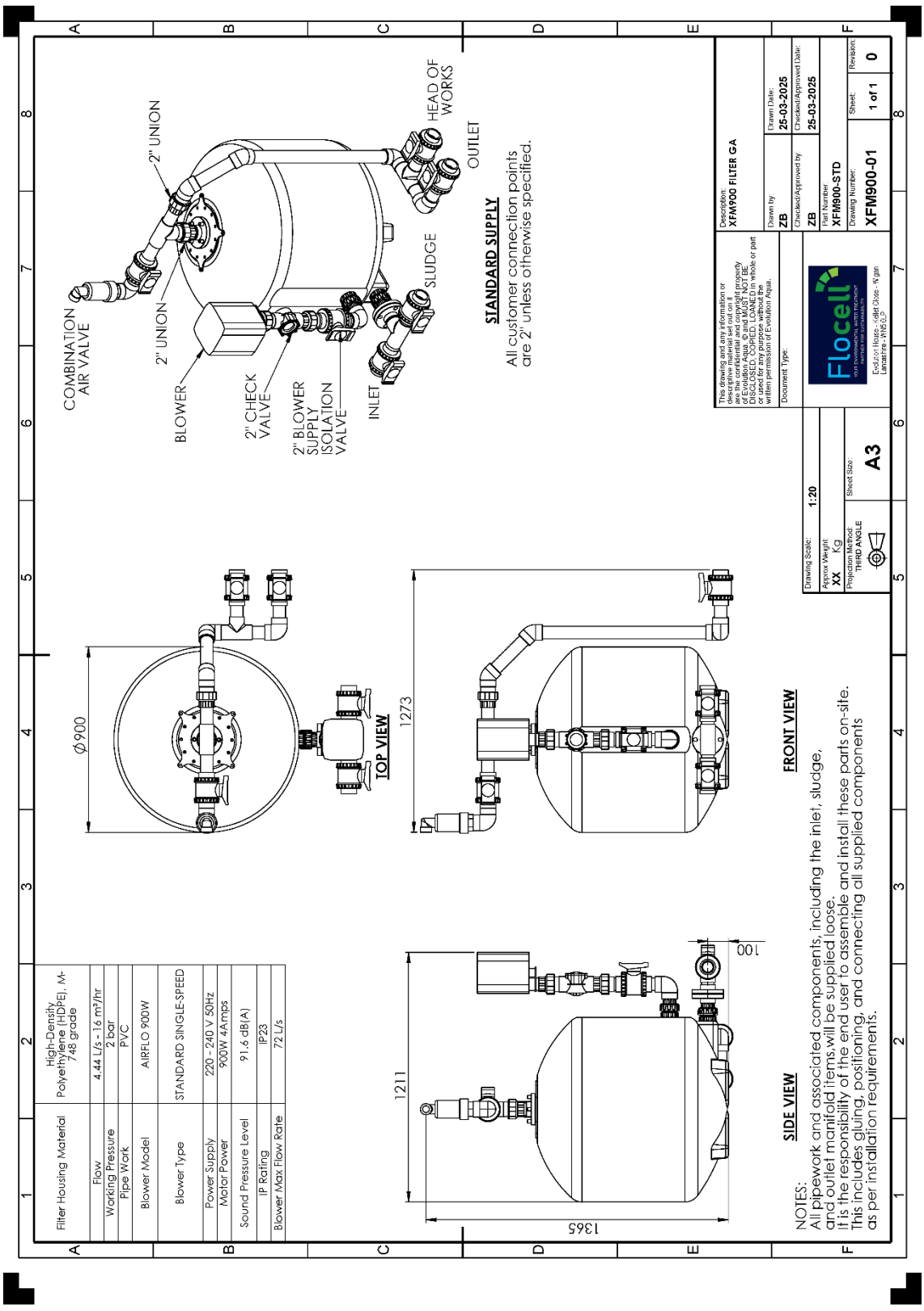
Connection	Size	Type
Inlet	2"	Plain End (for solvent weld or flanged connection)
Sludge Drain	2"	Plain End (for solvent weld or flanged connection)
Outlet	2"	Plain End (for solvent weld or flanged connection)
Head of Works Return	2"	Plain End (for solvent weld or flanged connection)

3. Specifications & Flow Rates

XFM 900	METRIC	IMPERIAL
Filter Diameter	**900 mm**	**36"**
Filtration Area	**0.64 m^2**	**6.89 ft^2**
Connection	**63 mm**	**2"**
Max Operating Pressure	**2 bar**	**29 psi**
Optimal Flow Rate	**16 m^3/hr**	**58.6 Imperial GPM / 70.5 US GPM**
Media Quantity	**250 litres**	**8.83 ft^3**

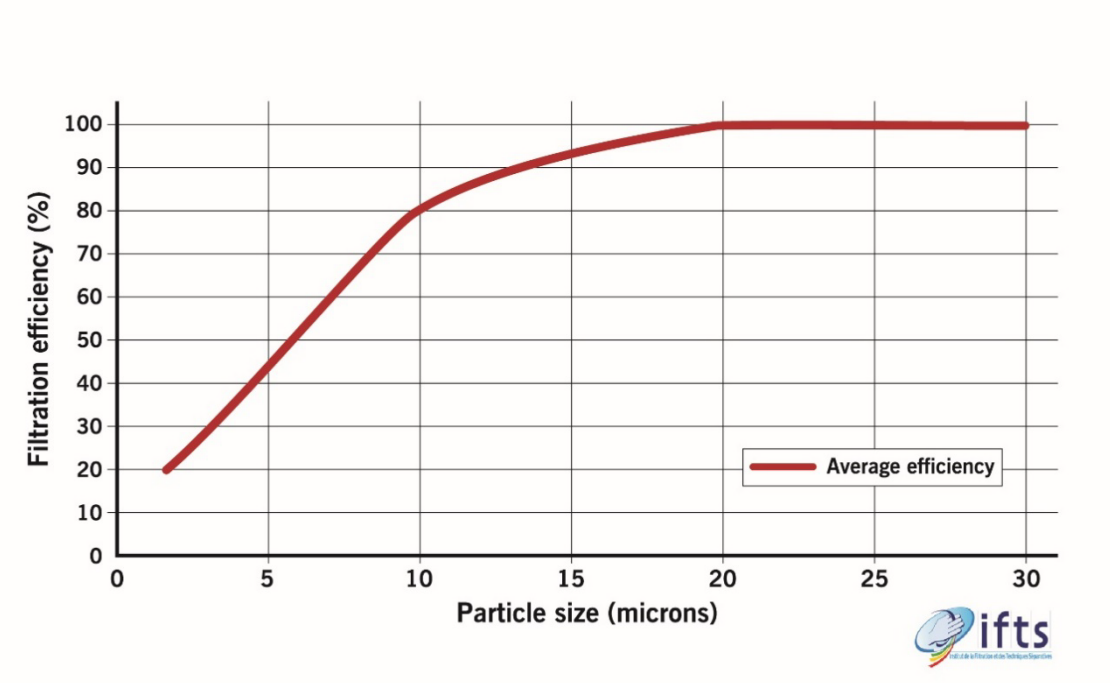
⚠️ *Most of the problems associated with operation are caused by either incorrect pump selection which causes particle shear or incorrect cleaning. Care should be taken to evaluate critical elements of operational design to achieve optimal results.*

4. General Arrangement Drawing



5. Media

Flocell XFM filters use a proprietary open-cell media that has been optimised for fine particle mechanical filtration.



The graph above shows expected performance as a function of the particles present; this can be used for mass balance calculations with the appropriate gravimetric test results to optimise cleaning frequency.

The XFM filter uses structured HDPE media designed to remove suspended solids typically in the 1–1,000-micron range, depending on influent characteristics, media condition, and flow rate. The system is not designed to remove gross solids or fine colloidal particles.

Gross Solids – Definition & Handling

Gross solids refer to larger, non-suspended solids typically greater than 1–2 mm in diameter, which may include:

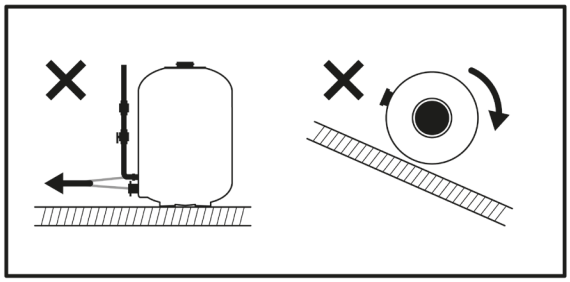
- Leaves, stones, large organic debris
- Fibre clumps, grit, or plastics
- Any material too large to flow freely through the filter's inlet screen.

Such solids can cause:

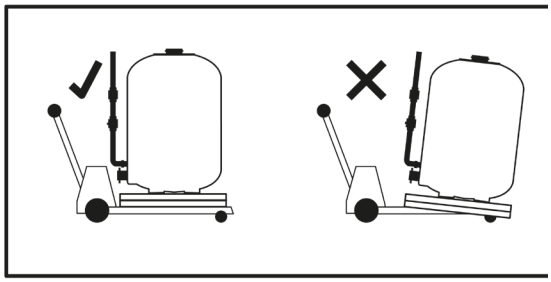
- Blockages at the inlet
- Damage to internal components
- Reduced filtration efficiency

6. XFM Filter Installation

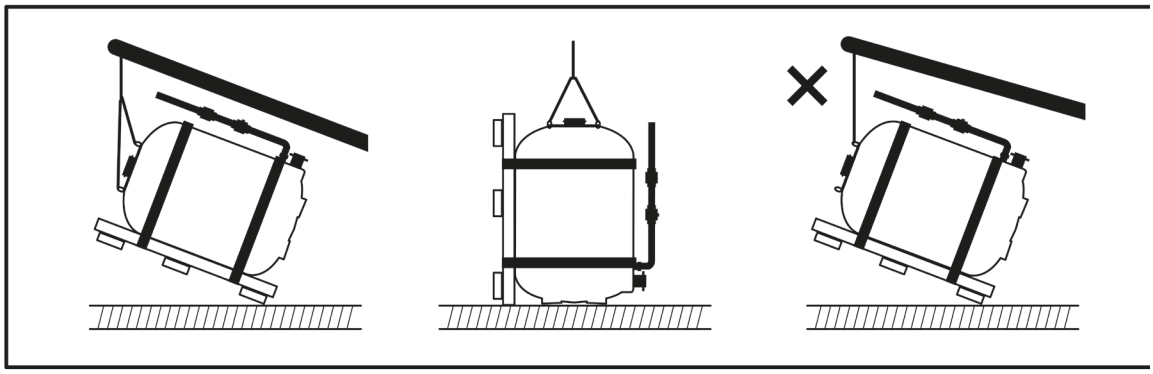
NOTE: Filters are delivered conveniently packed and due to their weight, size and difficulties arising in placing them, we recommend that their handling and movement be done with mechanical apparatus (forklifts, cranes, etc.).



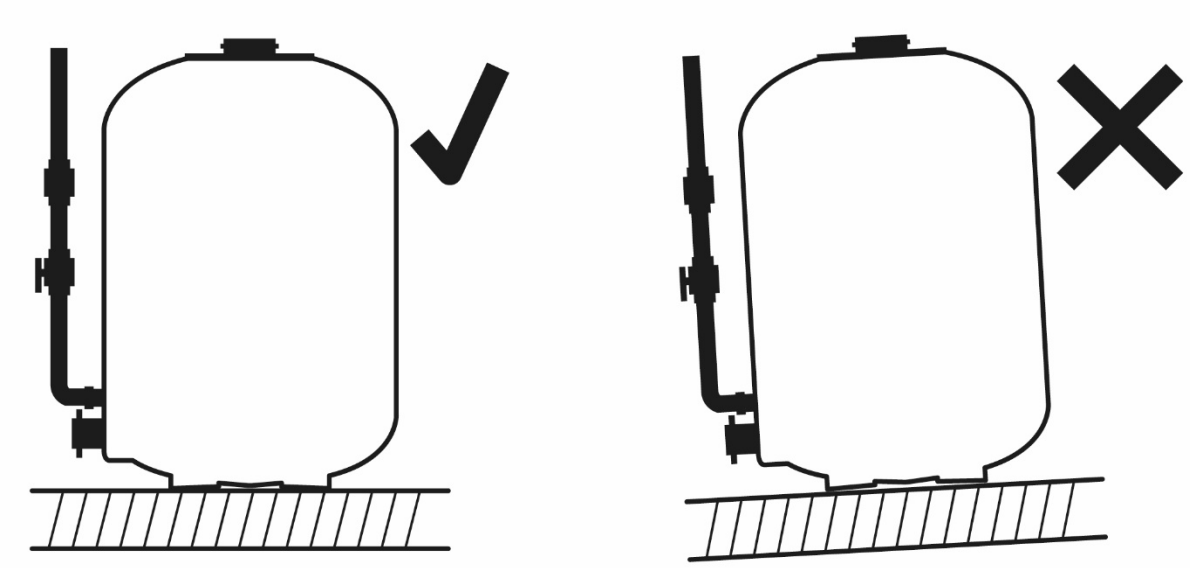
WARNING: NEVER DRAG A FILTER OR ROLL A FILTER



USE AN APPROPRIATE FORKLIFT TO MOVE A FILTER



USE ELEVATION RINGS TO PLACE THE FILTER DELIVERED IN AN HORIZONTAL POSITION TO VERTICAL POSITION



XFM filters should be installed as close as possible to the inlet supply and preferably at a level of 0.50 metres below the surface of the water in and settlement vessel or sump. Make sure there is accessible drainage for filter overflow.

The filter must be installed on a flat, level base, on firm ground or equivalent. Ensure the ground will not subside and strain pipework. We recommend using a flat solid concrete surface as a base large enough for the filter to be installed.

Under normal operating conditions the filter will not clog or block, but care must be taken to ensure no gross solids are admitted to the unit. In situations where this may occur it is vital to install the system so that water flow can be reversed to clear any potential blockage and allow for normal operations to continue.

It is imperative that inlet pressure does not exceed 2bar or damage may occur to the filter

In situations where no gravity supply (or waste) is possible, pumps must be installed for both inlet supply and waste filtrate removal.

Pump selection should be considered carefully as high-speed impeller pumps will degrade larger particles thus decreasing operational efficiency. As XFM filters do not suffer any hydraulic pressure increase a high-volume pump should be used in conjunction with a current inverter so flow rates can be adjusted accordingly and power use optimised.

7. Operational design

Flocell XFM filters are not designed to filter gross solids, and it is paramount that a pre-filter screen is present in any situation where this may occur.

- **Power Isolation:** Before performing maintenance on the filter or valves, ensure that the **pump (if installed) is switched off** and the filter is fully **depressurised**. For additional safety, disconnect the pump and any electrical installations from the power supply.
- **Pressure Limitation:** Never connect the filter directly to a pressurised water supply, as mains water pressure may exceed the filter's maximum operating pressure.
- **Sealing Components:** The filter connections use **O-rings**, eliminating the need to overtighten nuts or bolts. Over-tightening may damage the seals and components.
- **Chemical Exposure:** Avoid cleaning plastic parts with solvents, as they may degrade or weaken the material.
- **Child Safety:** Keep children away from the filter to prevent accidental operation or injury.
- **Cold Weather Protection:** Protect the filter from freezing conditions, as ice expansion may cause structural damage.
- **Installation Environment:** Install the filter in a **well-ventilated area** with **proper drainage**. The filter should be positioned as close as possible to the **water source** and below the **water level** to reduce the risk of airlocks and vacuum formation.

The Flocell XFM 900 Filter requires three main **connections** to function properly:

a. Main Connection Points

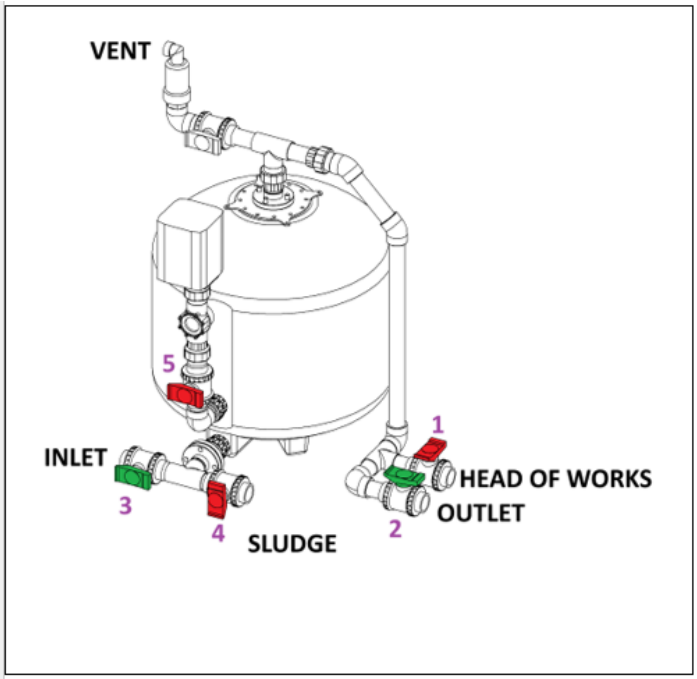
Connection Location	Function
Lower 2" / 63mm Connection	INLET and WASTE
Upper 2" / 63mm Connection	OUTLET and Head of Works
Note: The **Head of Works return line** is optional and depends on site requirements. After cleaning, a short carryover of residual dirty water may pass through the system before normal filtration resumes. During this initial phase, the flow can be directed to Head of Works. Refer to the **operational modes** in the next section for full details.	

8. Operational Modes

The **Flocell XFM 900 Filter** operates using an **up-flow filtration system**:

b. Filtration Mode:

1. **Inlet:** Water enters the filter through the **lower tank connection** (**INLET valve open, SLUDGE valve closed**).
2. **Filtration:** Water flows **upward** through the **floating media pack**, where suspended solids are captured.
3. **Outlet:** Clean, filtered water exits via the **foot valve** located below the **upper tank connection**.
4. **System Monitoring:** The **VENT valve** can be open or closed, depending on system requirements.



Head of Works Valve (1)	-	Closed
Outlet Valve (2)	-	Open
Inlet Valve (3)	-	Open
Sludge Valve (4)	-	Closed
Air Delivery Valve (5)	-	Closed

Incoming water enters through the **Inlet (3)**, flows upward through the filter, and then exits via the **Outlet (2)**.

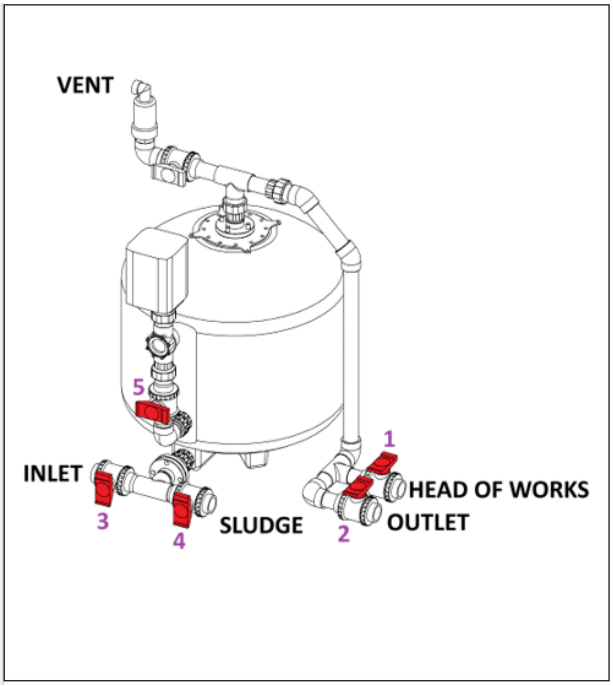
The **Inlet (3)** and **Outlet (2) valves** are **open**, while the **Air Delivery Valve (5), Sludge Valve (4), and Head of Works Valve (1)** are **closed**.

c. Cleaning Procedures

Single Filter Cleaning Process

I. Step 1: Preparation

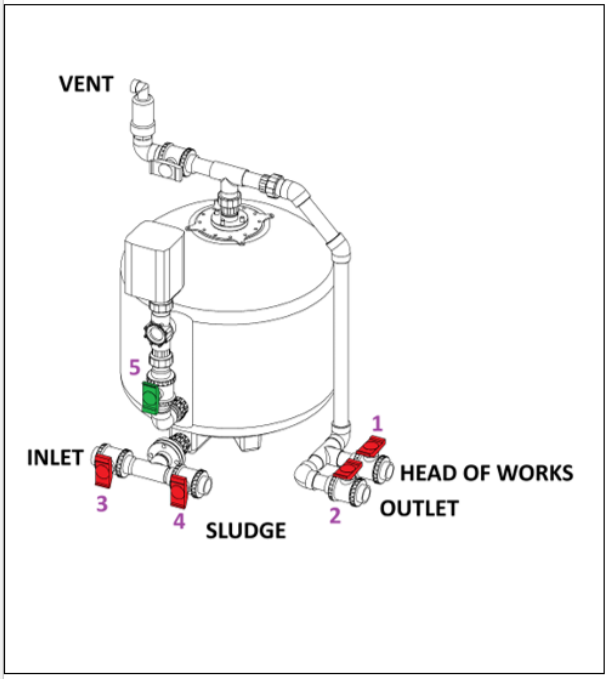
Care should be taken to ensure combination air valve is unobstructed to allow media to freely circulate during cleaning and to prevent pressure increase



Head of Works Valve (1)	-	Closed
Outlet Valve (2)	-	Closed
Inlet Valve (3)	-	Closed
Sludge Valve (4)	-	Closed
Air Delivery Valve (5)	-	Closed

To isolate the unit, first **turn off the feed pump**. Next, close the valves in the following order: **Inlet Valve (3), Outlet Valve (2), Head of Works Valve (1), and Air Delivery Valve (5)** to fully isolate the system.
Then, **open the Sludge Valve (4)** for approximately **five seconds** to allow the system to depressurise. A small volume of water will be released, alleviating system pressure and creating a headspace.
After this, **close the Sludge Valve (4)** to complete the process.

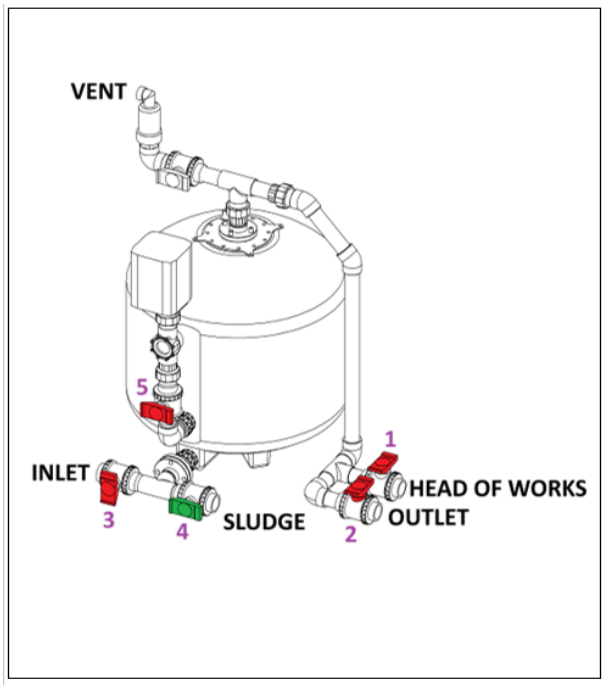
II. Step 2: Media Agitation



Head of Works Valve (1)	-	Closed
Outlet Valve (2)	-	Closed
Inlet Valve (3)	-	Closed
Sludge Valve (4)	-	Closed
Air Delivery Valve (5)	-	Open

Activate the **blower** and **open the Air Delivery Valve (5)**. The filter will shake as the air agitates the media pack.
After **10 minutes**, **close the Air Delivery Valve (5)** and **stop the blower** to complete the process.

III. Step 3: Sludge Removal

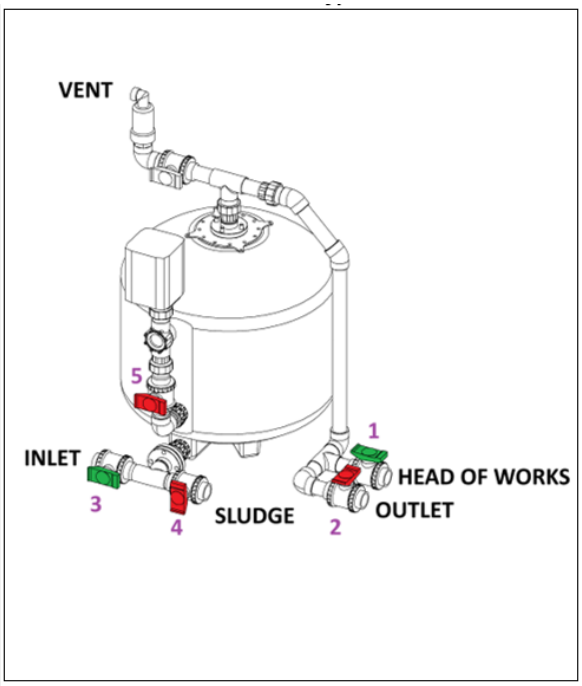


Head of Works Valve (1)	-	Closed
Outlet Valve (2)	-	Closed
Inlet Valve (3)	-	Closed
Sludge Valve (4)	-	Open
Air Delivery Valve (5)	-	Closed

Open the **Sludge Valve (4)** and allow the filter to drain until no sludge is coming out.

Once the sludge flow stops, **close the Sludge Valve (4)** to complete the process.

d. Refill on Head of Works Bypass Mode



Head of Works Valve (1)	-	Open
Outlet Valve (2)	-	Closed
Inlet Valve (3)	-	Open
Sludge Valve (4)	-	Closed
Air Delivery Valve (5)	-	Closed

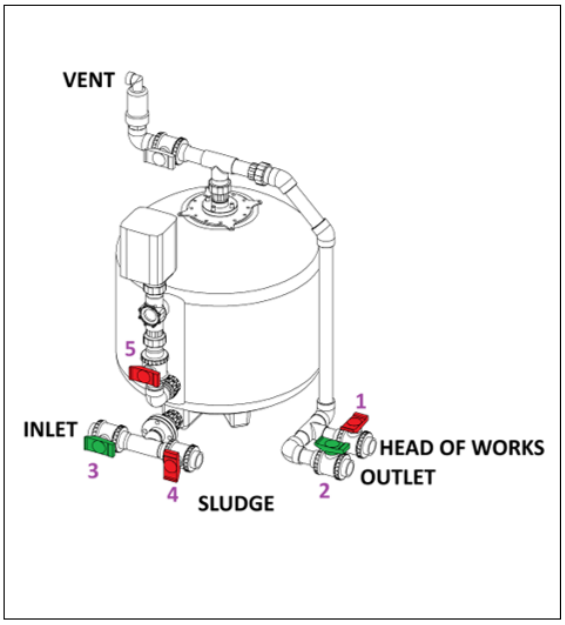
Open the **Head of Works Valve (1)** and **Inlet Valve (3)**.

Start the **feed pump**, allowing the filter to refill. Any carryover will be diverted to the **Head of Works line**.

Allow the carryover to clear, which typically takes around **10 minutes** to achieve optimal outlet quality.

Note: Ensure sufficient time for the filter to fill before assessing water quality.

e. Return to Operating Mode



Head of Works Valve (1)	-	Closed
Outlet Valve (2)	-	Open
Inlet Valve (3)	-	Open
Sludge Valve (4)	-	Closed
Air Delivery Valve (5)	-	Closed

Once the carryover has cleared, **open the Outlet Valve (2) first before closing the Head of Works Valve (1)** to prevent inadvertently pressurising the unit and ensure a smooth transition back to normal operating mode.

Verify that the **Air Delivery Valve (5)** and **Sludge Valve (4)** are **closed** to complete the process.

Multiple Filters in Parallel

With multiple filters connected, single control valves may be utilised, or the system can be valved to clean filters independently depending on operational requirements.

9. Maximising efficiency / performance

As all installations are different, cleaning frequency will need to be determined to limit cleaning when necessary.

In single and parallel installations, it may be optimal to run more than one cleaning cycle to prevent carry-over of dirty water transferred to the top of the filter during air sparging, but it is unlikely that more than 2 cleaning cycles will be needed in even the most loaded systems.

It is quite normal for some solids to appear in the outlet immediately after cleaning. This occurs as diluted material becomes trapped during cleaning. It will clear after a few minutes of filtering.

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10. Troubleshooting

The following table outlines common issues, potential causes, and corrective actions for the Flocell XFM 900 Filter:

Issue	Possible Cause	Solution
No inlet flow	Inlet valve closed	Check that the inlet valve is fully open
	Outlet valve closed	Ensure the outlet valve is open
	Pump not running (if pump-fed)	Verify pump operation if a pumped supply is used
No outlet flow	Outlet valve closed	Open the outlet valve
	Inlet valve closed	Ensure the inlet valve is open
	Insufficient water in filter	Open the overflow vent valve to release trapped air
Low inlet flow	Pump not running (if pump-fed)	Ensure the inlet pump is running
	Obstruction in balancing tank (if applicable)	Check for blockages in the balancing tank outlet
Low outlet flow	Outlet valve partially closed	Fully open the outlet valve
	Air trapped inside filter	Open the vent valve to remove trapped air
Dirty outlet water	Filter requires cleaning	Perform a cleaning cycle as outlined in the Cleaning Procedures section
No air delivery during cleaning	Air delivery valves closed	Ensure all air delivery valves are open
	Combination air valve – isolation valve closed	Open the isolation valve to the combination air valve, to allow air to circulate.
	Blower not operating	Confirm the blower is powered on and functioning correctly
No media movement during cleaning	Insufficient air space in filter	Reduce water level by sending some water to waste, then restart air supply
	Overflow vent valve blocked	Ensure the overflow vent valve or Combination Air Valve is clear and functional
Unable to empty filter post-cleaning	Waste valve closed	Open the waste valve fully
	Combination air valve – isolation valve closed	Open the isolation valve to the combination air valve to allow air entry
	Outlet pump not running (if applicable)	Ensure the outlet pump is operational

By following these troubleshooting steps, most operational issues with the Flocell XFM 900 Filter can be resolved efficiently.

11. Spare Parts & Maintenance Checklist

Recommended Spare Parts

Part Description	Recommended Qty
XFM Fines Media	As required
Combination Air Valve	1 spare
Sludge Drain Valve	1 spare
Inlet/Outlet Ball Valves	2-3 spares
O-Ring Seals for Pipe Connections	1 set
Airline Isolation Valve	1 spare
Non-Return Valve (Airline)	1 spare
Vent Valve Assembly	1 spare

12. Maintenance Checklist

Maintenance Task	Frequency	Notes
Check all valve function and seals	Monthly	Lubricate O-rings if necessary
Test air blower function	Monthly	Check airflow and motor condition
Clean air valve and airline	Quarterly	Prevent clogging or moisture buildup
Flush sludge line to prevent sediment buildup	Monthly	Especially important in high loading
Check for any leaks or pressure surges	Monthly	Resolve immediately
General system inspection and retightening	Bi-monthly	Especially after first installation

13. Quick Reference – Do's and Don'ts Table

✅ **Do's**	❌ **Don'ts**
✅ Install on a solid, level base	❌ Don't exceed 2 bar inlet pressure
✅ Use pre-filter for gross solids	❌ Don't connect directly to unregulated mains pressure
	❌ Don't overtighten pipe connections
✅ Keep the vent valve clear and operational	❌ Don't allow freezing water inside the filter
✅ Perform regular inspections and maintenance	❌ Don't clean plastic parts with harsh solvents
✅ Allow air sparging before sludge removal	❌ Don't operate blower while valves are closed
✅ Reduce water level before cleaning cycles	❌ Don't operate without draining capacity or overflow path

14. Appendices

a. Blower Technical specifications and Operation and Maintenance Details

Supplied Model: AIRFLO 900W

Compact Design

The compact design of Waterco's spa blowers enables installation in smaller areas and tight corners. The convenient position of the mounting base and air inlet/outlets reduces installation time and cost.

Thermal Cutout

Waterco spa blowers feature an important safety feature, an integral thermal cutout. This cutout stops the electric motor from becoming excessively warm. This cutout does not require manual resetting and will automatically restart the motor when it has sufficiently cooled.

Standard Model – Airflo, Whisperair, Whisperair S

The standard model of the blower draws air into the unit through the bottom cowl of the blower.

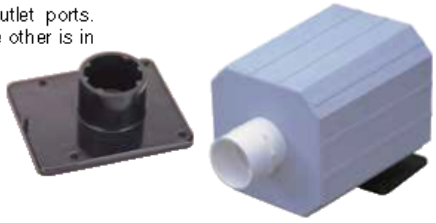
The airflo version has air inlet holes throughout the bottom cowl, while the Whisperair models draw all the required air in through gaps around the perimeter of the bottom cowl.

Air switch Models (Whisperair S and Whisperair S Elite)

The Whisperair S comes with an air switch controller and connecting tubing to provide remote activation / deactivation of the blower. The button for the air switch controller is designed to be installed in the shell of the spa and is connected to the blower via tubing.

Variable mounts

All Waterco Blower's have two identical 50mm diameter outlet ports. One of the ports is in the bottom cowl of the blower and the other is in the side of the blower. The stand can be attached to either of these ports and leaves the other free to connect to the spa via the piping. It is also possible to connect the pipe to the outlet port in the bottom cowl of the blower and seal off the other outlet port.



Technical Data

Product Description	Power (Watts)	Amps (A)	Max. Operating Pressure (kPa)	Max. Flow Rate (lt /sec)	Max. Operating Noise (dBa)	Voltage (V)	Cycle (Hz)	Unit Weight (kg)	Electrical Protection Rating	Inlet / Outlet Ports (mm)
Airflo Spa Blower	900	4.0	17	72	91.6	220-240	50	5	IP23	50
Whisperair Spa Blower	900	4.0	17	72	91.0	220-240	50	5	IP23	50
Whisperair Spa Blower with Air Switch	900	4.0	17	72	91.0	220-240	50	5	IP23	50
Airflo Spa Blower	1200	5.8	27	72	94.6	220-240	50	5	IP23	50
Whisperair Spa Blower	1200	5.8	27	72	94.0	220-240	50	5	IP23	50
Whisperair Spa Blower with Air Switch	1200	5.8	27	72	94.0	220-240	50	5	IP23	50