

FLOCELL XFM FILTERS

INSTALLATION & OPERATING MANUAL

TERMS & CONDITIONS



**PLEASE READ INSTRUCTIONS THOROUGHLY BEFORE
INSTALLATION AND COMMISSIONING**



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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.

Low cleaning frequency

Due to very high retention capacity, cleaning cycles are far less frequent than with other technologies therefore increasing operational efficiencies.

No hydraulic pressure loss

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

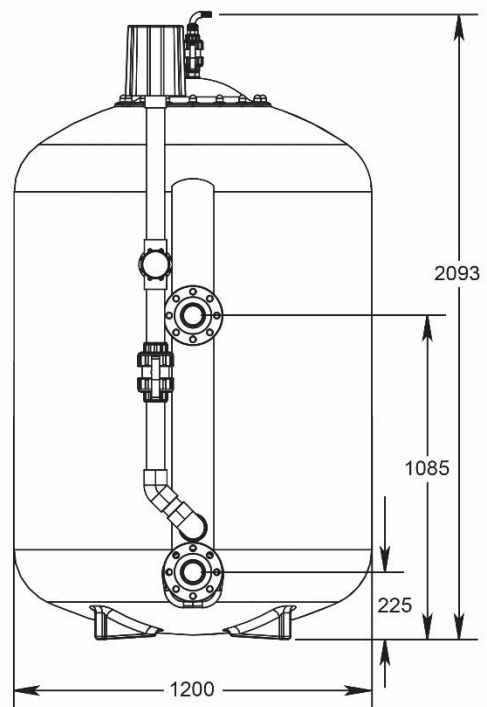
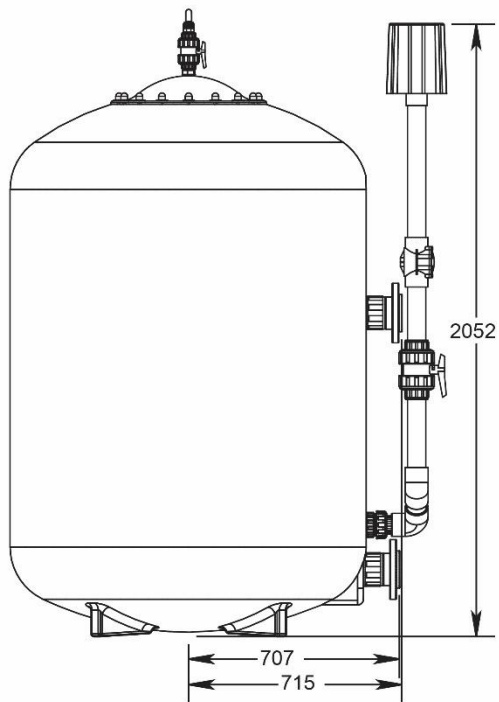
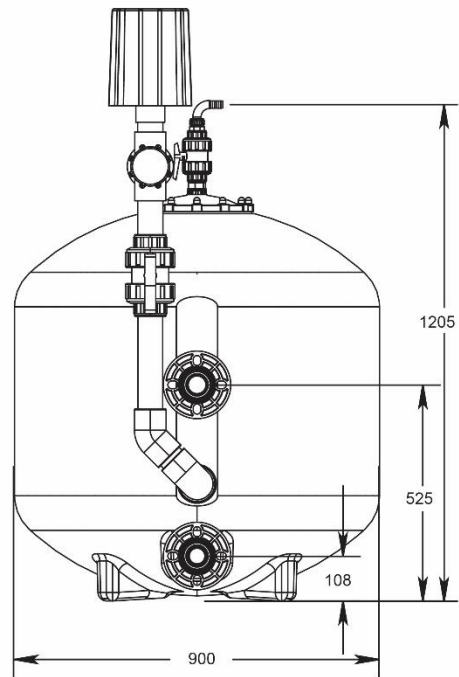
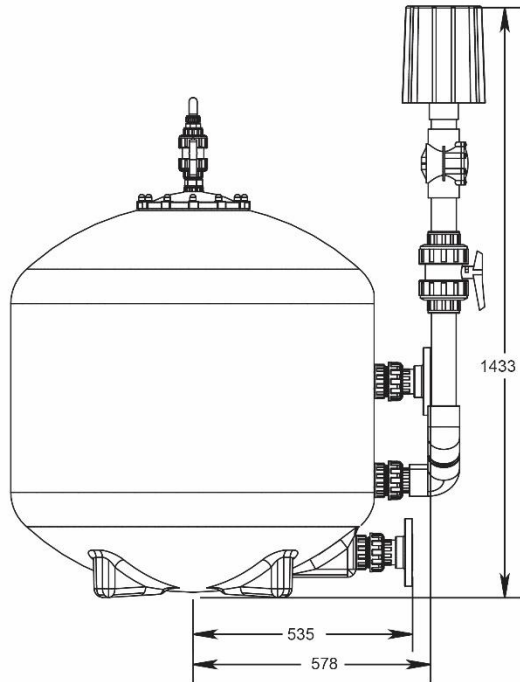
Low water use and air-cleaning

XFM filters are cleaned by air sparging for a short period of time before a single volume of concentrated filtrate is sent to waste having first isolated the filter(s). They require either a pumped or gravity supply.

Low operating costs

XFM filters have much lower operating costs associated with power and water use. Whilst not typically used for absolute, single pass filtration, XFM filters instead work by constantly removing a percentage of the particles present. In situations where single pass filtration is the only option, multiple filters are installed in series/parallel or a screened balancing tank or sump is present in order to continually filter a body of water.

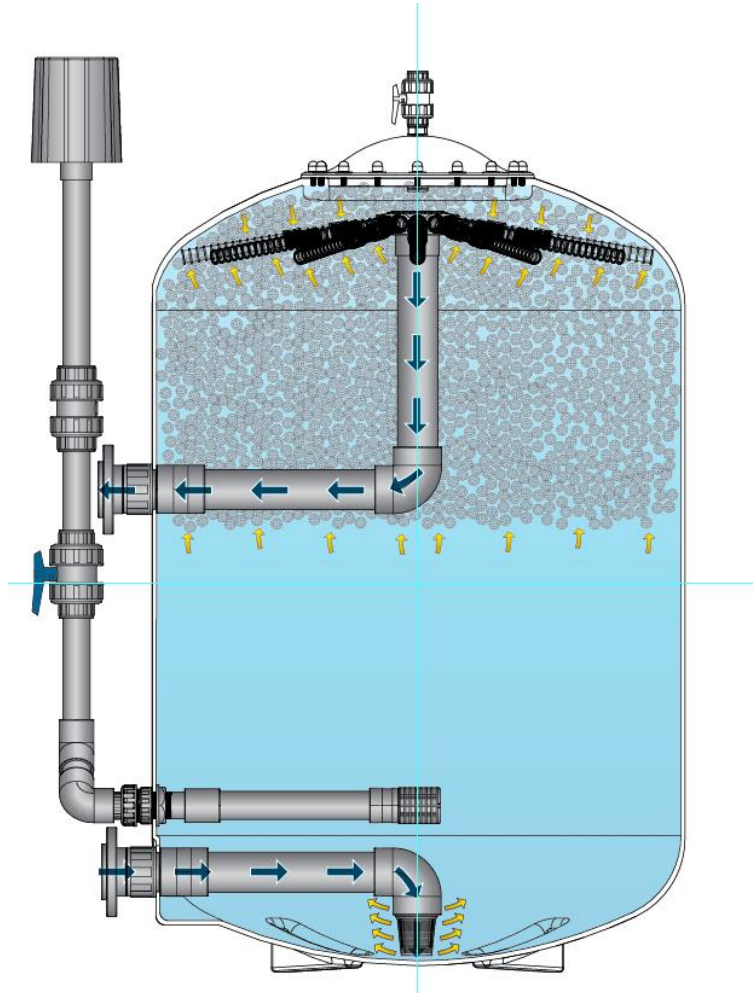
Dimensions (in mm)



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 (see also Maximizing Efficiency section).



Flocell XFM filters upflow units where inlet water is admitted to the filter body via the lower tank connection. This connection is also used for filtrate removal after a cleaning cycle.

Water flows up through the floating media pack and exits the filter through laterals installed through the upper tank connection.

During a cleaning cycle, air is admitted to the filter body via an independent connection having first isolated the inlet and outlet. After agitating the media for a timed cycle, the now dirty filtrate is removed from the filter and sent to waste.



Care should be taken to ensure the overflow is open during cleaning to allow media to freely circulate and to prevent pressure increase that will prohibit cleaning of the installed filter pack



After cleaning, water is re-admitted to the filter to continue operation.

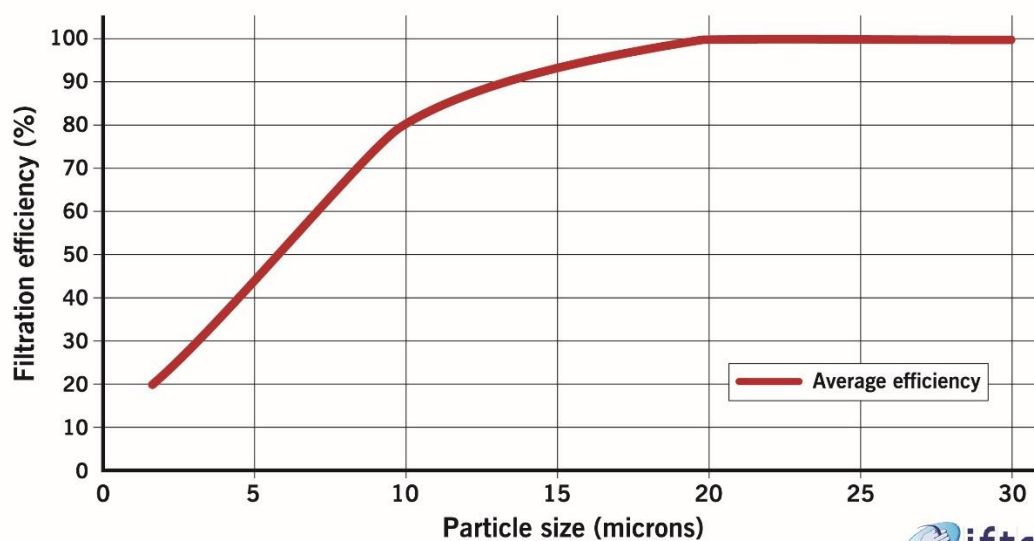
Specifications & Flow Rates

	XFM 900		XFM 1200	
	METRIC	IMPERIAL	METRIC	IMPERIAL
Filter Diameter	915mm	36"	1200mm	48"
Filtration Area	0.64m ²	6.9 SF	1.13m ²	12.1 SF
Connection	63mm	2"	90mm	3"
Max Pressure	2.0bar	30 psi	2.0bar	30 psi
Optimal Flow Rate	16m ³ /hr	9.4 CFM	20m ³ /hr	11.8 CFM
Media Quantity	250 l	8.8 CF	1200 l	42.4 CF

Media

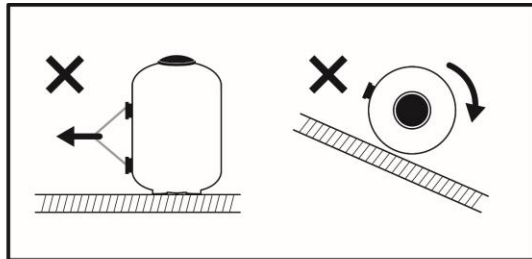
Flocell XFM filters use a proprietary open-cell media that has been optimised for fine particle mechanical filtration.

The table below 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.

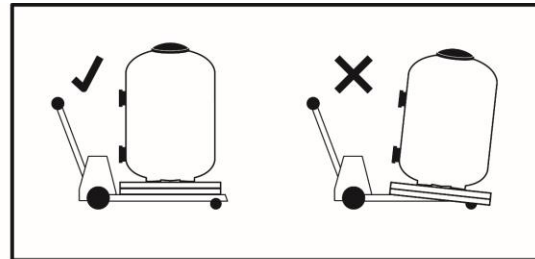


Installation

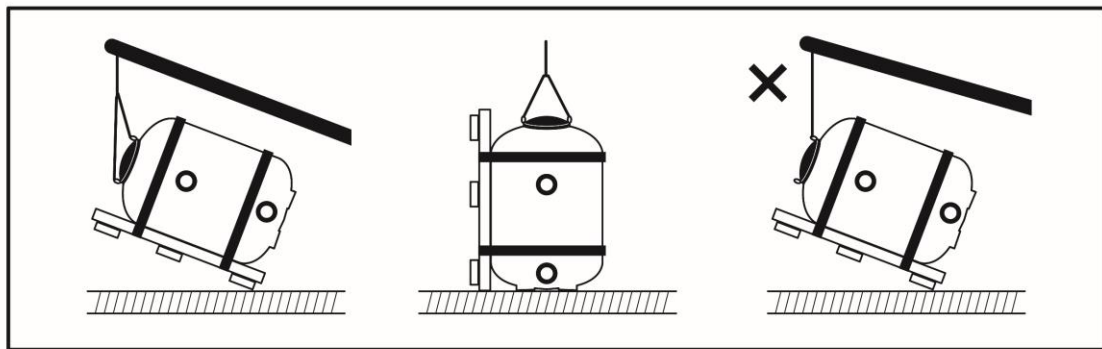
NOTE: Filters are delivered conveniently packed and due to their weight, size and difficulties arising in placing them, we recommend that their handling and movement be done with mechanical apparatus (forklifts, cranes, etc.).



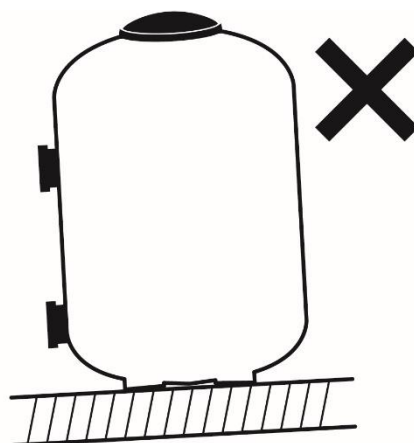
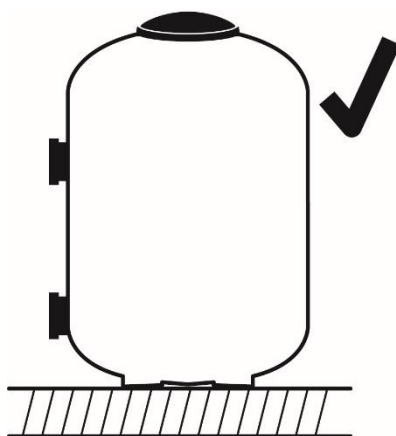
WARNING: NEVER DRAG A FILTER OR ROLL A FILTER



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 a 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 in order to clear any potential blockage and allow for normal operations to continue.



It is imperative that inlet pressure does not exceed 2.0 bar 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.

Operation



The installed air blower must be sited above the filter body or a non-return valve installed before the air-supply to limit the potential for accidental water ingress to the blower



- Before working on the filter or valves, make sure the pump is switched off and the filter is de-pressurised. For greater safety, disconnect the pump and possible electric installations connected to the mains.
- Never connect the filter directly to the water supply, since it's pressure can be higher than the maximum pressure of the filter (2bar / 30psi).
- As the parts connect using O-rings, it is not necessary to overtighten any nuts / bolts.
- Do not clean plastic parts with solvents.
- Do not let children handle the filter or play near them.
- Protect the filter from freezing.
- Before connecting the pump, make sure that the filter lid is closed.
- Install the filter in an area with ventilation and adequate drainage as close as possible to the water body, below the water level to help prevent an air lock or vacuum from occurring.

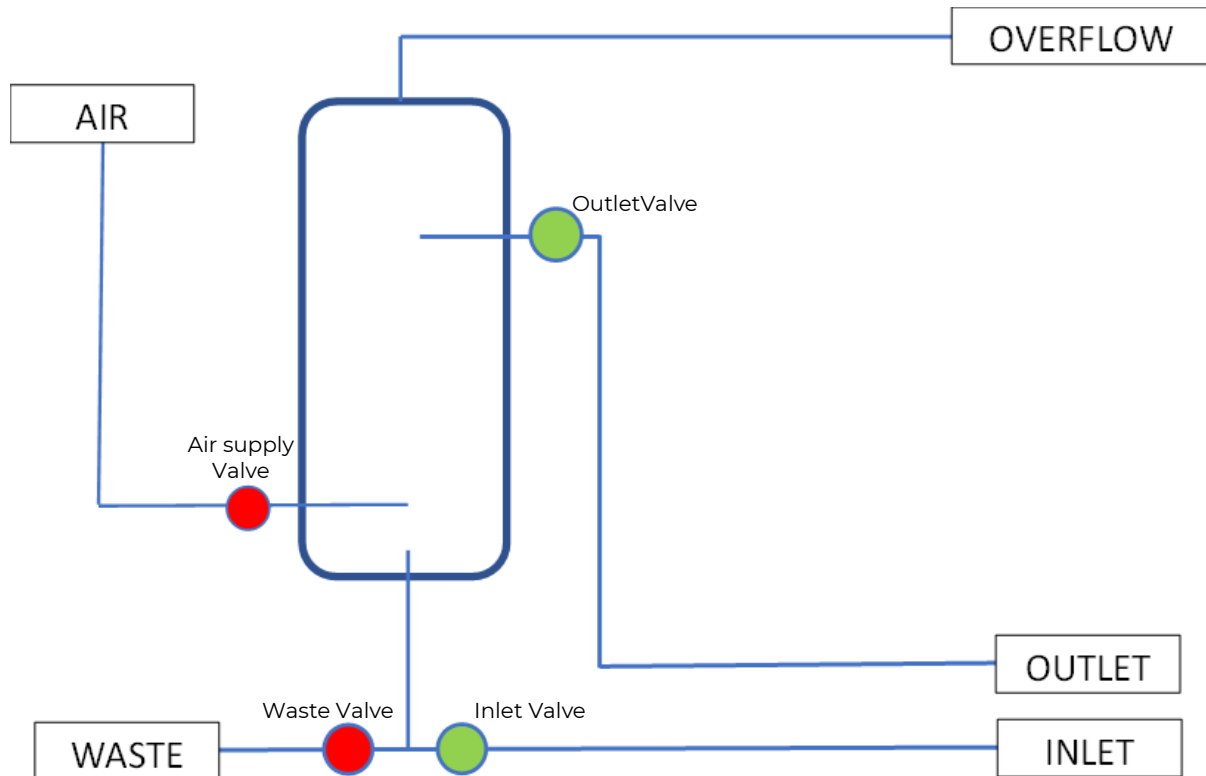
IMPORTANT – USE OF VALVES ON OVERFLOW LINE

In certain situations it may be beneficial to install a valve on the overflow line. These situations may include (but are not limited to):

- Larger installations where multiple filters are installed in series or parallel which may require independent cleaning but that have a linked overflow line.
- Situations where an open return is a significant distance from drain, where water recovery is vital but that cannot accommodate a suitable pipe-run.

Care **MUST** be taken to ensure that when cleaning, the overflow line is **OPEN**. This will allow for the media to be circulated by incoming air. If the overflow line is not open, the incoming air will cease and the filter pack will not be able to be cleaned.

Single Filters



In single filter situations, the inlet supply is connected to the lower tank connector with an isolation valve.

The outlet is connected to the upper connector with an isolation valve.

In situations where continuous supply is encountered, a bypass should be installed back to the 'dirty' watercourse before the main inlet supply valve.

Overflow line should be installed either open to a drain or back to the nearest pre-filtration water supply by an open return.

To operate filter open Inlet Valve and open Outlet Valve ensuring Waste Valve is closed.

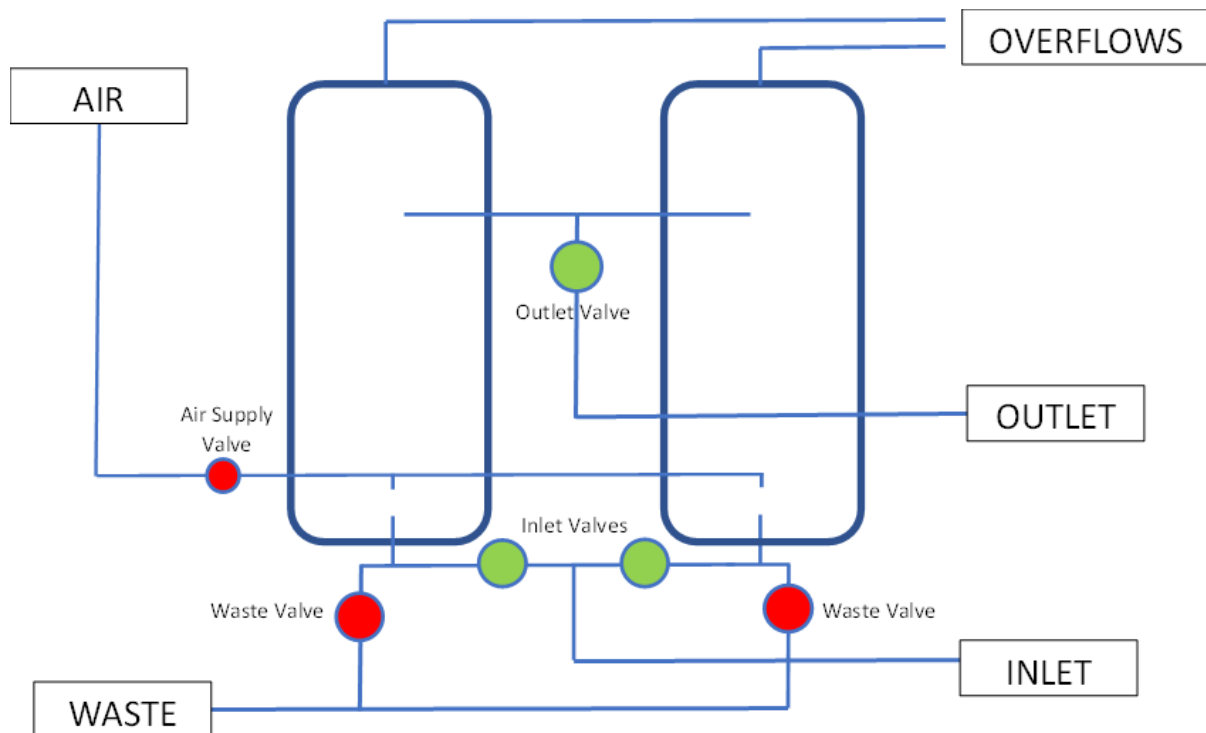
Note **GREEN** open valves and **RED** closed valve positions



Always ensure air supply valves are CLOSED before operating filter to ensure no water ingress to blower.



Parallel Filters



In dual or any multiple parallel filter situations, the inlet supplies are connected to the lower tank connectors via a manifold with isolation valves to allow flow balancing. Either a manifolded single or individual connections to the main inlet line are possible but in the case of a single connection, individual balancing valves are required for optimal performance.

The outlets are attached to the upper connectors by way of a manifold with a main valve on the manifold leg to allow for isolation.

In situations where continuous supply is encountered, a bypass should be installed back to the 'dirty' watercourse before the main inlet supply valve.

To operate filters, open Inlet Valves and Outlet Valve.

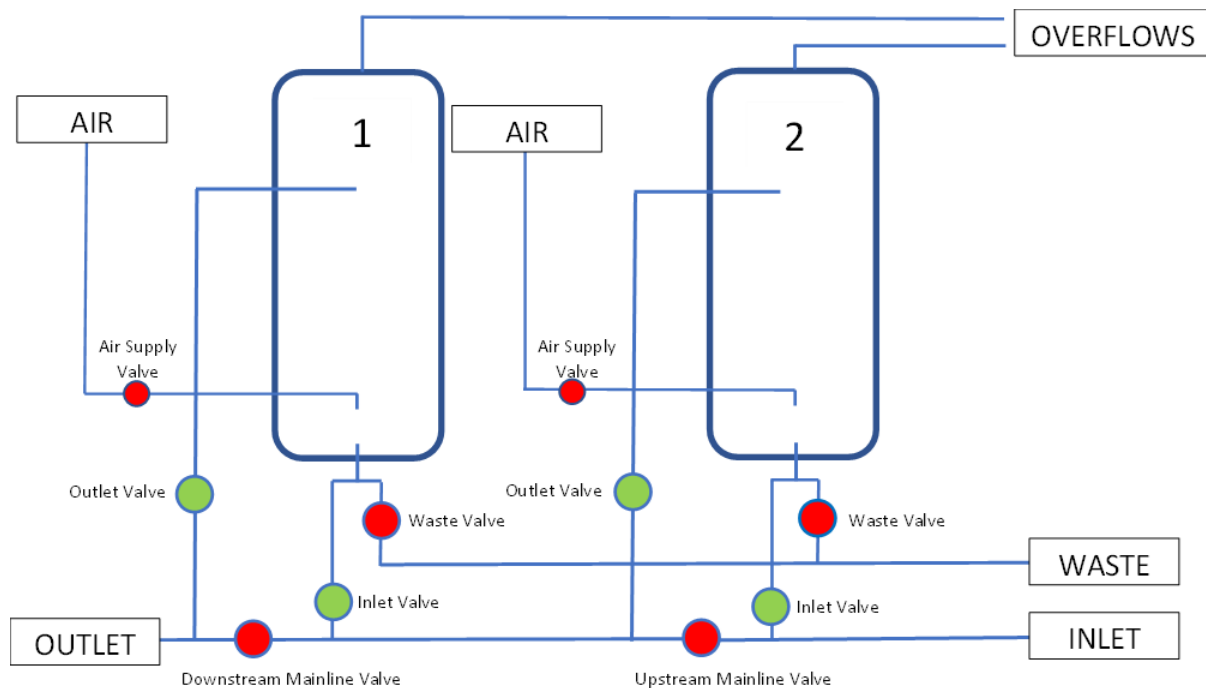
Note **GREEN** open valves and **RED** closed valve positions



Always ensure air supply valves are CLOSED before operating filter to ensure no water ingress to blower.



Series Filters



In series filter situations, the main inlet supply is connected to one side of the T fitting on the lower tank connectors of the filters with an isolation valve to allow for cleaning.

The outlet of the first (and subsequent) filter(s) is connected to the inlet side of the T fitting on the lower tank connector(s).

The waste line is connected with valves to both filters via the unused side of the lower T connectors, this can be achieved by way of a manifolded line.

To operate, open Inlet Valves, close Upstream and Downstream Mainline valves (two shown on schematic), open both Outlet Valves.

Inlet flow passes through filter 2 then filter 1 to allow for continuous filtration.

Note **GREEN** open valves and **RED** closed valve positions.



Always ensure air supply valves are CLOSED before operating filter to ensure no water ingress to blower.



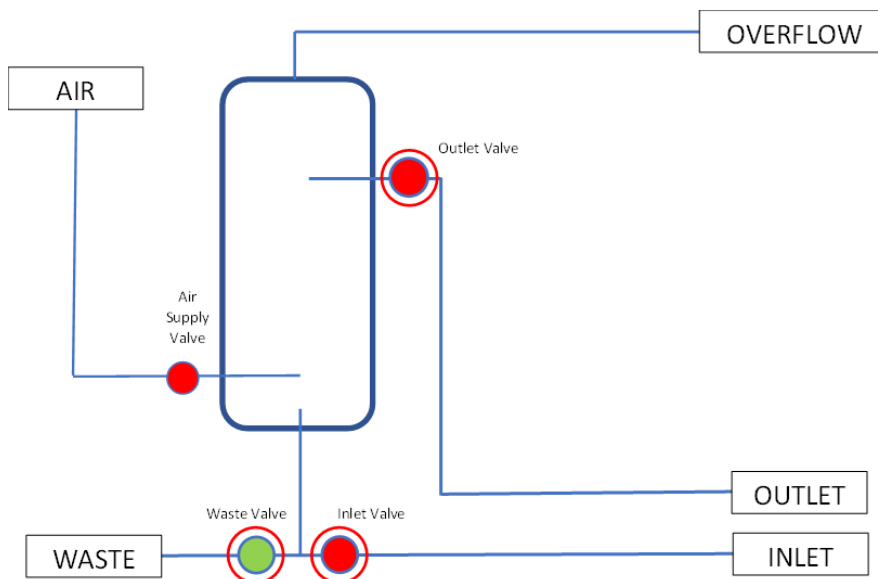
Cleaning Procedures



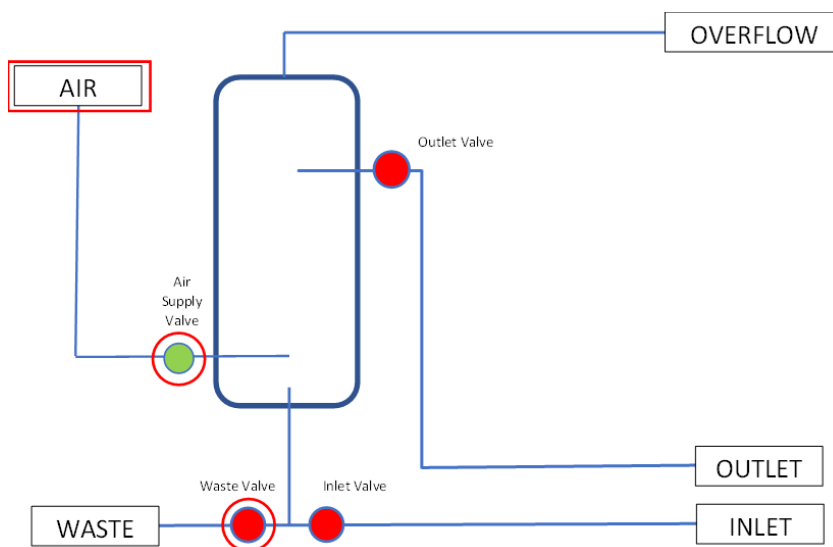
It is imperative that inlet valve is always closed before outlet valve to prevent excess pressure.



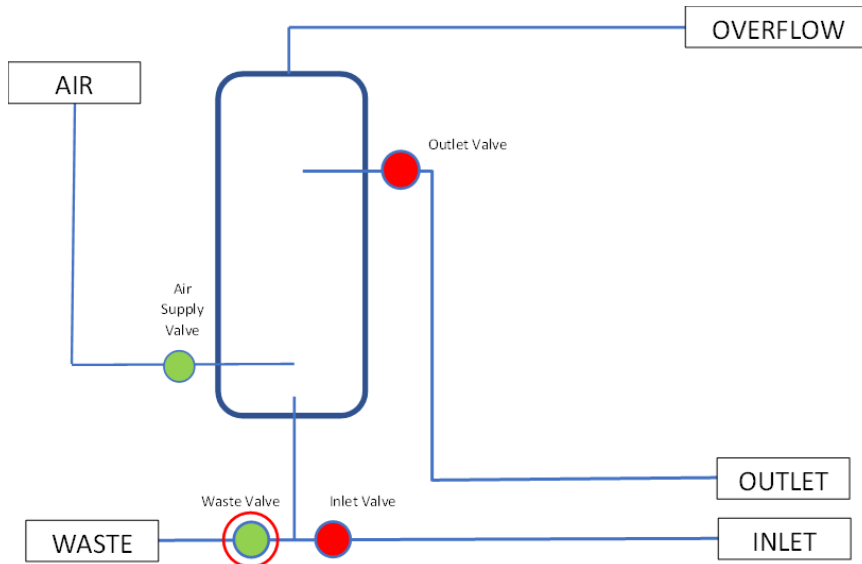
Single / Parallel Filters



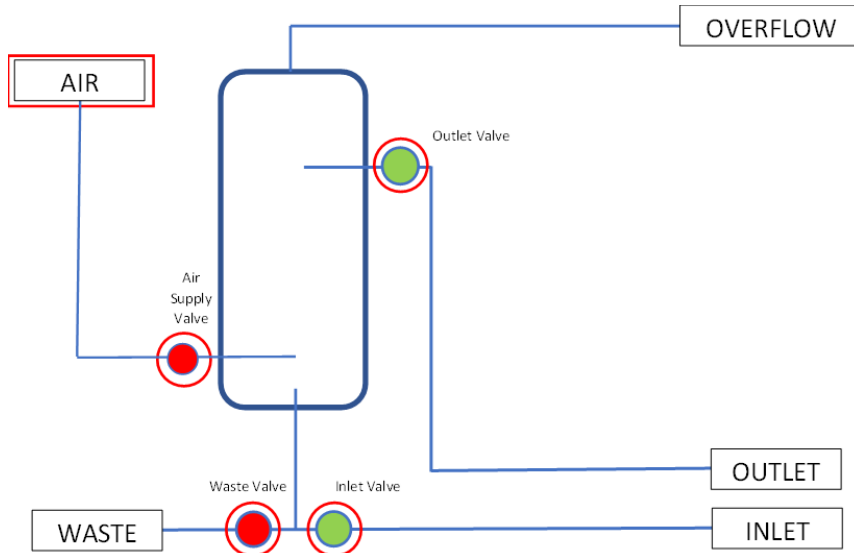
To clean filter, firstly isolate filter by closing Inlet and Outlet Valves. Open Waste Valve and send water to waste for approximately 1 minute to allow an air space to form at the top of the filter.



After 1 minute, close Waste Valve and open Air Supply Valve and turn on Air Blower.
 Allow 10 minutes for the media to circulate before turning off Air Blower and then closing Air Supply Valve.



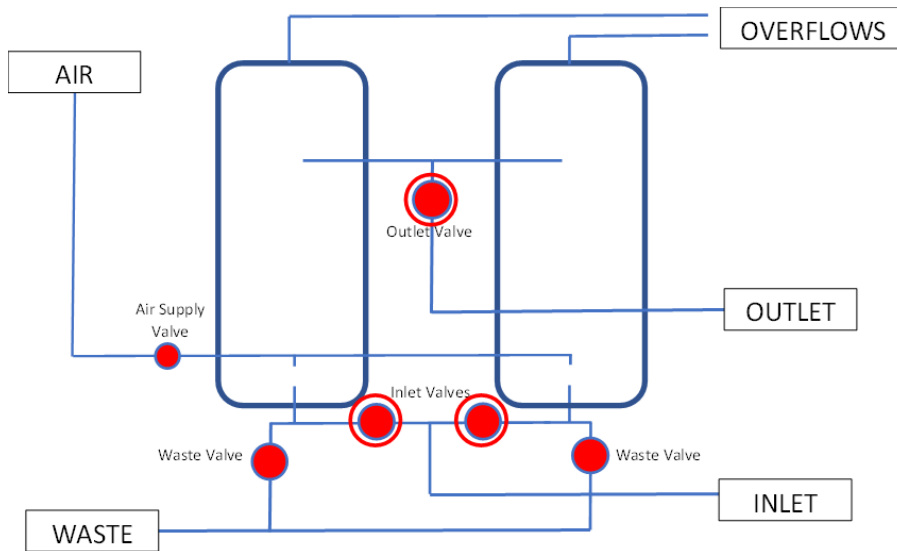
Finally, send filter contents to waste by opening Waste Valve until filter body is empty.



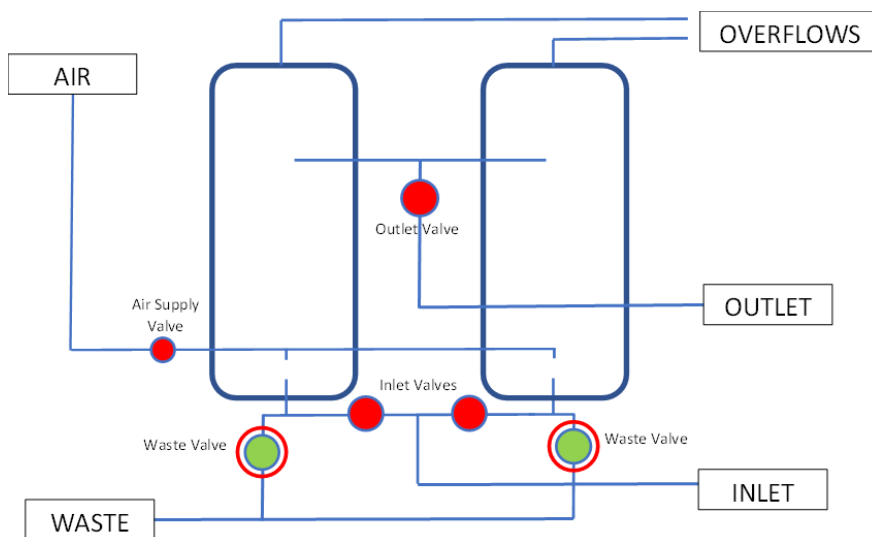
To refill filter turn off Air Supply Valve and close Waste Valve. Open Inlet and Outlet valves.

For optimal efficiency, undertake a second cleaning cycle once filter refilled.

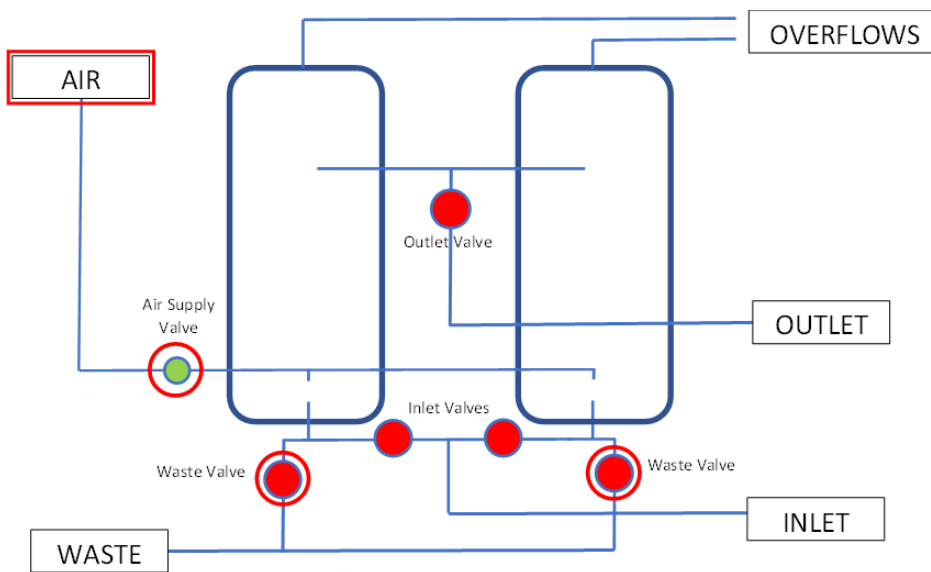
Parallel Filters



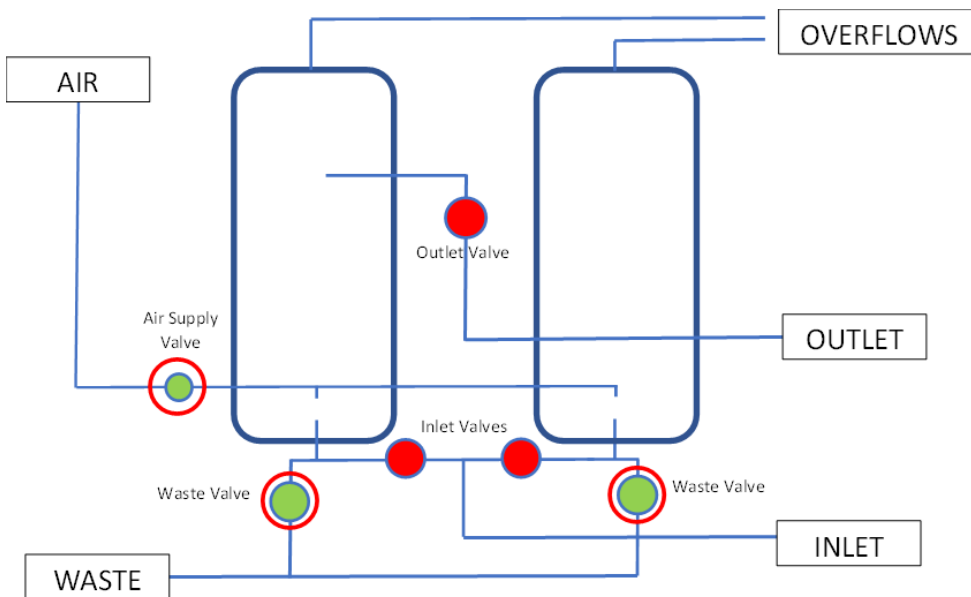
To clean filters installed in parallel, firstly isolate filters by closing Inlet and Outlet Valves.



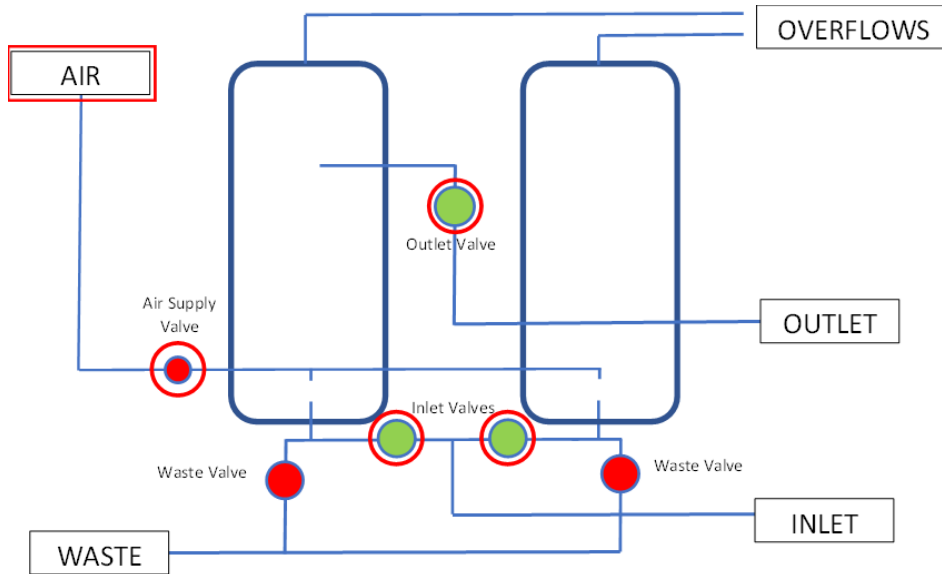
Open Waste Valves and send water to waste for approximately 1 minute to allow an air space to form at the top of the filter.



After 1 minute, close Waste Valves and open Air Supply Valve and turn on Air Blower. Allow 10 minutes for the media to circulate.



Finally, send filter contents to waste by opening Waste Valves until filter body is empty.



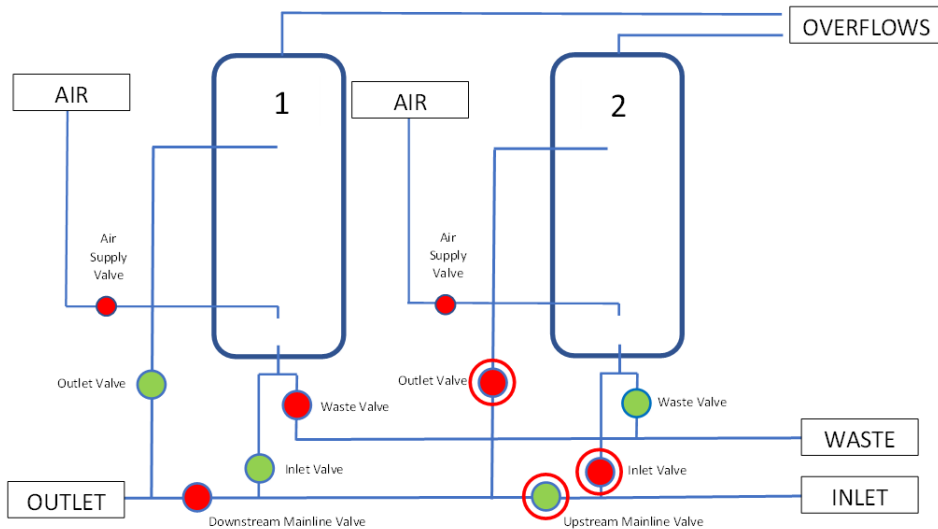
To refill filter turn off Air Supply Valve and close Waste Valves. Open Inlet and Outlet valves.

For optimal efficiency, undertake a second cleaning cycle once filter refilled.

Series Filters

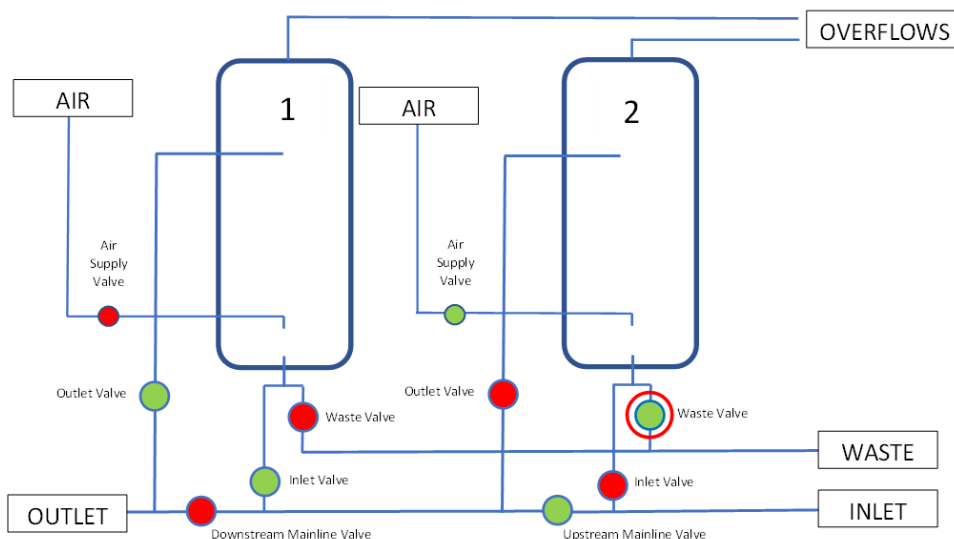
In series operation, filters can be cleaned and isolated individually as required. In normal operations, the downstream filter will require cleaning approximately 50% less frequently than the upstream filter.

Cleaning Cycle – Filter 2



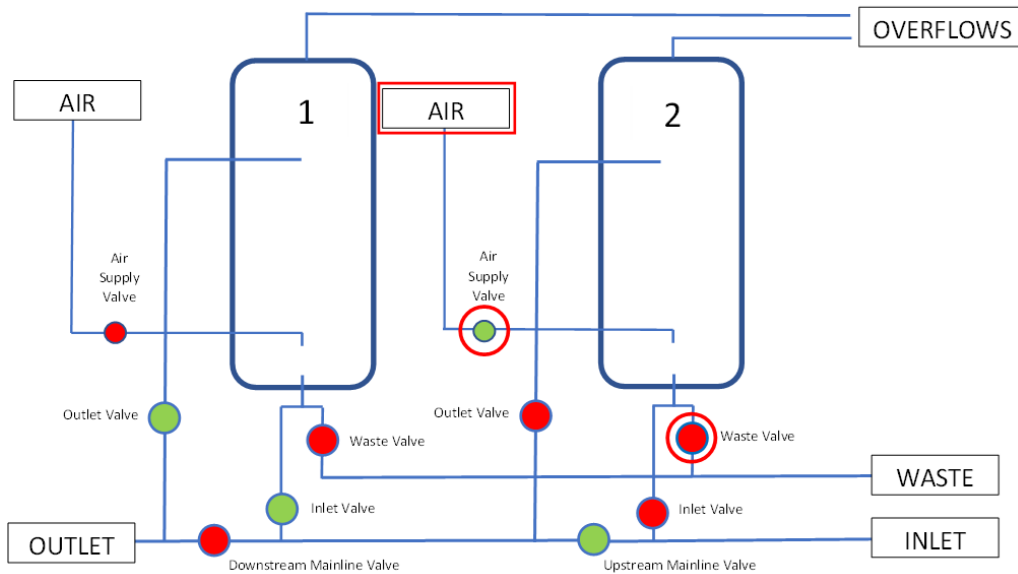
To clean filter 2 (as primary filter) isolate by opening Upstream Mainline Valve to divert flow then close Inlet then Outlet Valves of Filter 2.

Cleaning Cycle – Filter 2



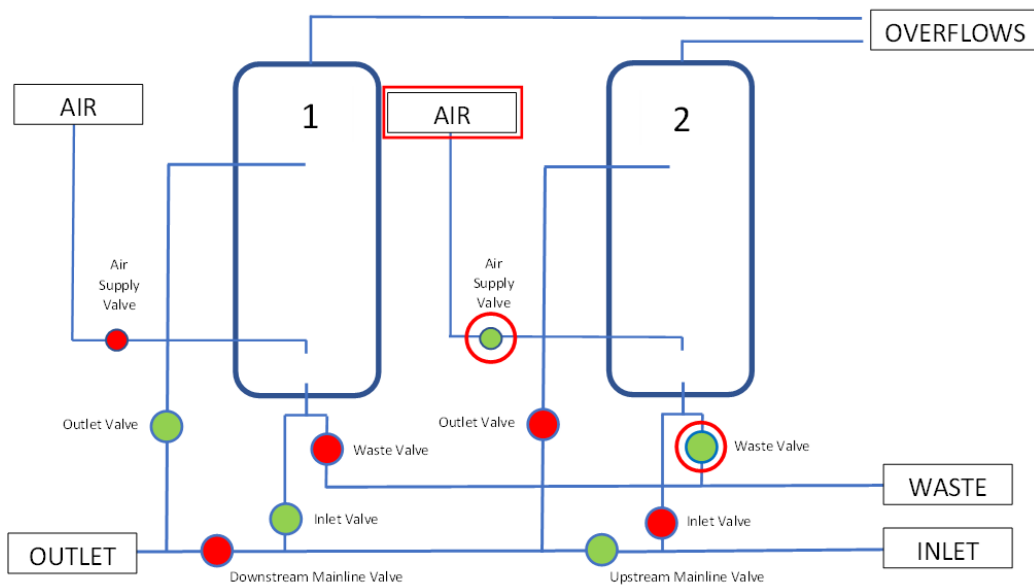
Open Filter 2 Waste Valve for 1 minute to allow air space creation for media circulation.

Cleaning Cycle – Filter 2



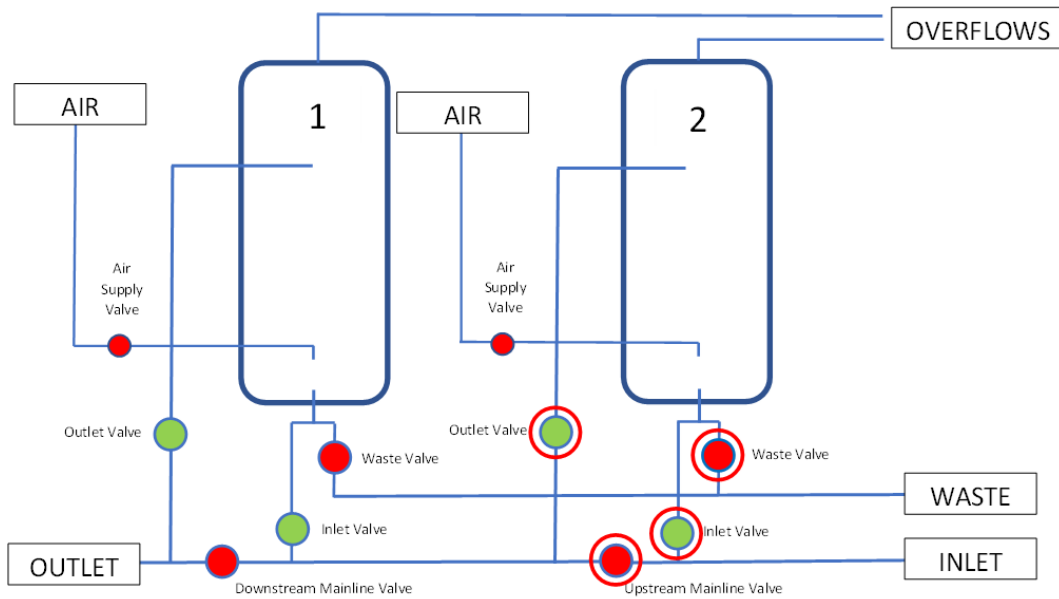
Close Filter 2 Waste Valve and open Filter 2 Air Supply Valve, turn on Filter 2 Air Blower and allow media to circulate for 10 minutes.

Cleaning Cycle – Filter 2



Open Filter 2 Waste Valve and allow filter to empty to waste. When Filter 2 is empty, close Filter 2 Waste Valve. Close Filter 2 Air Supply Valve and turn off Filter 2 Air Blower.

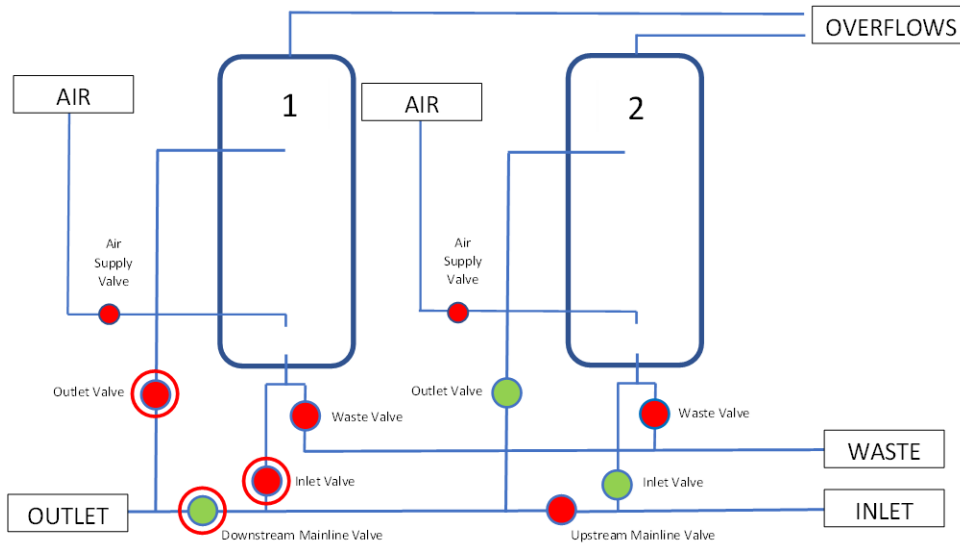
Cleaning Cycle – Filter 2



To refill Filter 2 and bring back on line, close Filter 2 Waste Valve, open Filter 2 Inlet and Outlet Valves close Upstream Mainline Valve.

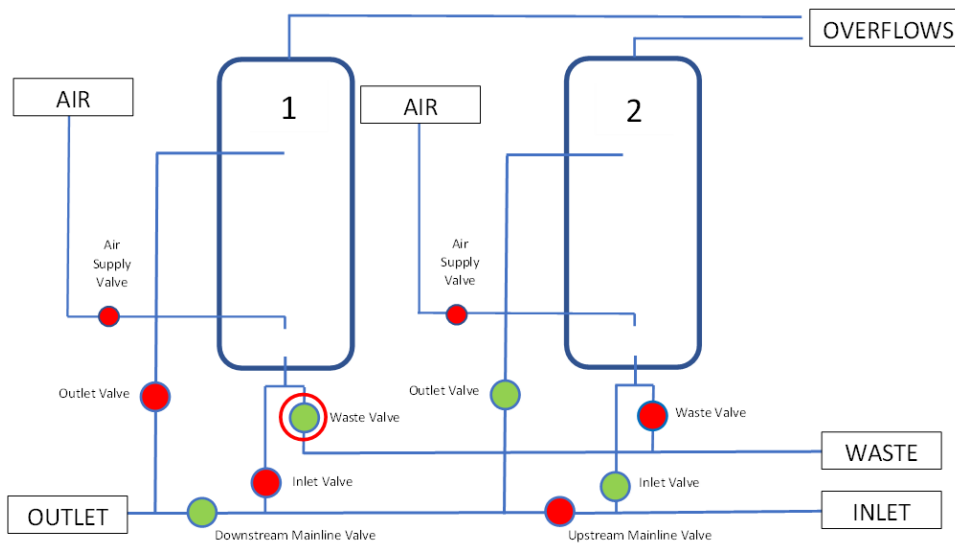
Filter 1

Cleaning Cycle – Filter 1



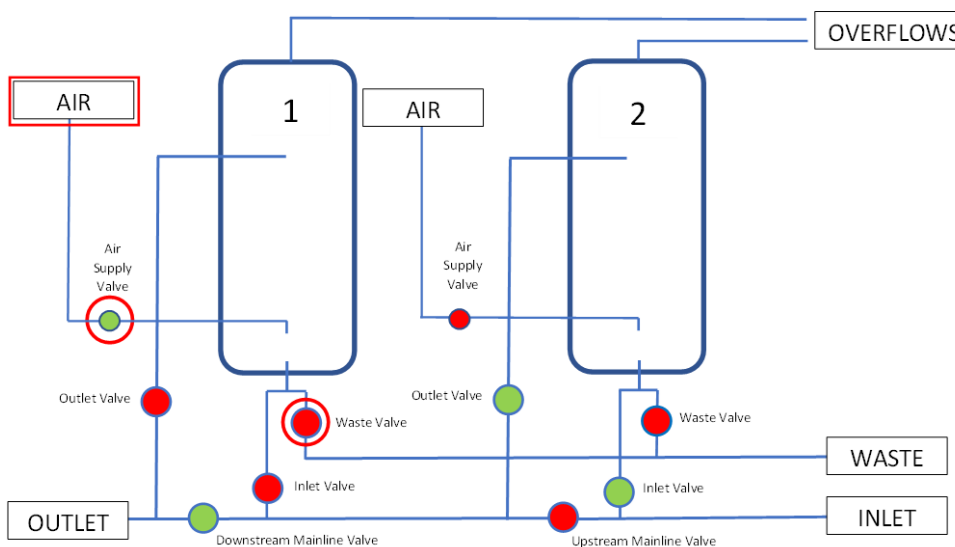
To clean filter 1 isolate by opening Downstream Mainline Valve then closing Filter 1 Inlet then Outlet Valves.

Cleaning Cycle – Filter 1



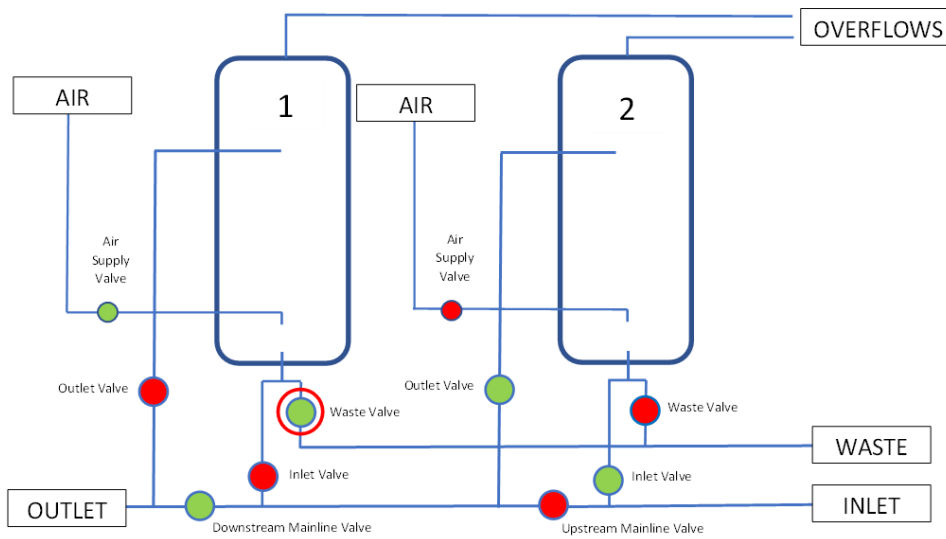
Open Filter 1 Waste Valve for 1 minute to allow air space creation for media circulation.

Cleaning Cycle – Filter 1



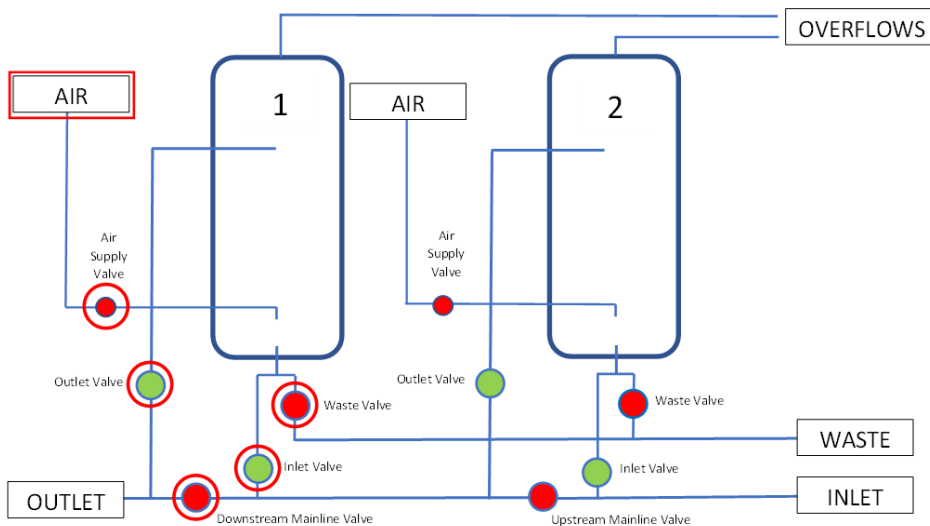
Close Filter 1 Waste Valve and turn on Filter 1 Air Blower. Open Filter 1 Air Supply Valve and allow media to circulate for 10 minutes.

Cleaning Cycle – Filter 1



Open Filter 1 Waste Valve and allow filter to empty to waste.

Cleaning Cycle – Filter 1



To refill Filter 1 and bring back on line, close Filter 1 Air Supply Valve and turn off Filter 1 Air Blower. Close Filter 1 Waste Valve, close Main Downstream Outlet valve, open Filter 1 Inlet and Outlet valves.

Maximising efficiency / performance

Gross Solids

Where situation may mean that solids could enter the filter it is recommended that extra precautions are taken to ensure any potential blockage can be remedied.

Pre-screening from receiving waterbody is absolutely vital to ensure the filter footvalve remains functional.

Situations where this may occur could include for example:

- Balancing tanks receiving unscreened effluent
- Any body of water exposed to sunlight where algal mats may form

If there is ANY risk of this occurring – 2 extra precautions should be used:

1. A valve configuration should be installed to allow the filter flow to be reversed.
2. A manifold airline should be installed to allow airflow to be diverted to the inlet line in order to help dislodge a blockage.

Cleaning

As all installations are different, cleaning frequency will need to be determined by the operator in order to limit cleaning to when necessary.

In many 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.

In series filter installations, it is optimal that the first filter in the series is cleaned twice as often as the secondary filter in series etc.

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 being back online.

Troubleshooting

No inlet flow

Check Inlet Valve(s) open
Check Outlet Valve(s) open
Check Inlet pump is running if pumped supply

No outlet flow

Check Outlet Valve is open
Check Inlet Valve open
Check Inlet pump is running if pumped supply
Ensure overflow is open.

Low inlet flow

Check Inlet pump running if pumped supply
Check if Outlet from balancing tank (if present) is obstructed

Low outlet flow

Check Outlet Valve fully open
Ensure overflow is open.

Dirty outlet water

Undertake cleaning cycle(s)

No air delivery when cleaning

Ensure Air Blower Valve is open
Ensure overflow is open
Ensure blower is turned on and working

No media movement during cleaning

Ensure sufficient air space inside filter body to allow media to circulate.
If no airspace present, turn off Air Blower and Air Supply Valve, send water to waste for a short period (1 minute), turn on Air Blower and open Air Supply Valve.
Ensure overflow is open

Unable to empty filter post cleaning

Check Waste Valve open
Check Overflow is open
Ensure Outlet Pump is working if present