AQUIFY

Regenerative Media Filter

Operation, Maintenance, and Design Guide

Fiberglass Series

CAUTION

Read the manual in its entirety. This manual contains essential information about the installation, operations, maintenance, and safe use of this product. Equipment must be installed and serviced by a qualified technician. Improper installation can void the warranty and cause bodily injury. All weights and dimensions are approximate. All dimensions are in inches; all weights are in pounds.

For all questions, please contact Aquify Systems or a certified Aquify Systems Support Agent.

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General

The regenerative media filter manufactured for Aquify Systems utilizes the latest in aquatics technology to reduce the consumption of water while providing superior quality and clarity. The filter has a notable reduction of energy and chemical costs, minimal footprint, and environmentally friendly filtering media. These features make it a sustainable solution for any mechanical room. The fiberglass line of filters has been specifically designed for harsh aquatics environments where steel products are inadequate or undesired in application. The tank is constructed for long-lasting performance and durability and is NSF-50 listed to stringent safety, performance, and water quality requirements. This certification allows for the highest quality filter tank and system for optimal performance.

Method of Operation

Precoat filters, also known as regenerative media filters, are the most efficient type of pool filters available. They trap small particles using a series of small tubes with a layer of precoat media, which aids in filtering the water. As the filter begins to filter the water, the particulates become trapped in the precoat layer. Over time, this causes a small head loss throughout the filter. Once the maximum head loss is reached, the filter will cycle and flush the precoat from the tank along with the trapped particles, re-coat the filter with a fresh precoat, and begin the filter operation again. The cycle allows for maintenance-free operation and highly efficient performance, unlike traditional cartridge filters.

Pulse Cycle

At the maximum head loss, the filter controller will activate the pulse mechanism. The valves will automatically reposition, while air is exhausted from the pulse diaphragm, forcing water through the flexible tube element assembly to support this process. The porous filaments are then expanded, loosening the media from the particulates. The captured particulates settle to the bottom filter, and the flexible tube elements are re-coated with the media. The filter cycle is then reactivated, and flow is restored without backwashing or requiring a media change. The filter cycle should continue at the original optimal influent flow for an extended period. Once the particulates accumulate at the bottom of

the tank, and optimal pressure and flow cannot be restored, the used media is then drained from the tank via gravity into the sewer, septic, or holding tank.

Fusion 360 File Links

The links below can be used to download universal file types for the filters. Your exact filter configuration (controller location, vacuum placement, and lower flange position) may not be represented with these files. The online viewer may also be used to view the 3D models of the filter using only a web browser.

Model	Download Link
PMF-30-100-FRP	https://a360.co/2H26TAu
PMF-30-200-FRP	
PMF-30-300-FRP	
PMF-36-400-FRP	https://a360.co/2H5unVp
PMF-36-500-FRP	
PMF-42-600-FRP	https://a360.co/31blznC
PMF-42-700-FRP	
PMF-48-800-FRP	https://a360.co/2Iwluo5
PMF-48-900-FRP	
PMF-54-1000-FRP	https://a360.co/3k2p7zT
PMF-54-1200-FRP	
PMF-60-1400-FRP	https://a360.co/3iWnuTa
PMF-60-1600-FRP	

Aquify Design Standards

Aquify recognizes the challenges that designers face to integrate products into their workflow in the age of automated design tools like Autodesk Revit. We provide 2D technical drawings, AutoCAD blocks for our 2D designers, and 3D files in multiple formats, including automated Revit families for our 3D designers. Our Revit families automatically select the correct Aquify product for your piping configuration and include additional parameters to be used in piping analysis from within Revit. If your workflow is not supported natively, our Fusion 360 files can be converted online to nearly every format. The tables below can be used as a quick reference for installation specifications and part number lookup.

Integration

Flow Requirements

The Aquify Regenerative Media filter systems are available from 30" through 60" tank diameters with 50 psi operating pressure and rated flow from 50 GPM to 2400 GPM. These values yield an effective filtration rate of up to 2.0 GPM/SF. If flowrates are outside of these recommended ranges, contact an authorized Aquify representative.

The filters are designed for a 50-psi working pressure and hydrostatically tested to 75-psi.

Components List

The Aquify Precoat Media filter can be ordered as a single unit, or for trouble-free installation can be ordered as a preconfigured reference design using premium Aquify components. For customized configuration options please contact an authorized Aquify support agent.

The nature of Aquatics design creates a collaborative effort amongst designers, contractors, equipment suppliers, and owners. Aquify provides the essential components for the regenerative media filter and can provide optional accessories from the Aquify catalog. The table below shows the required components for the Aquify Regenerative media filter reference design, and which components are supplied in a typical regenerative media filter quote. Note that additional plumbing and fittings may be required for proper installation. For more information, contact an authorized Aquify support agent.

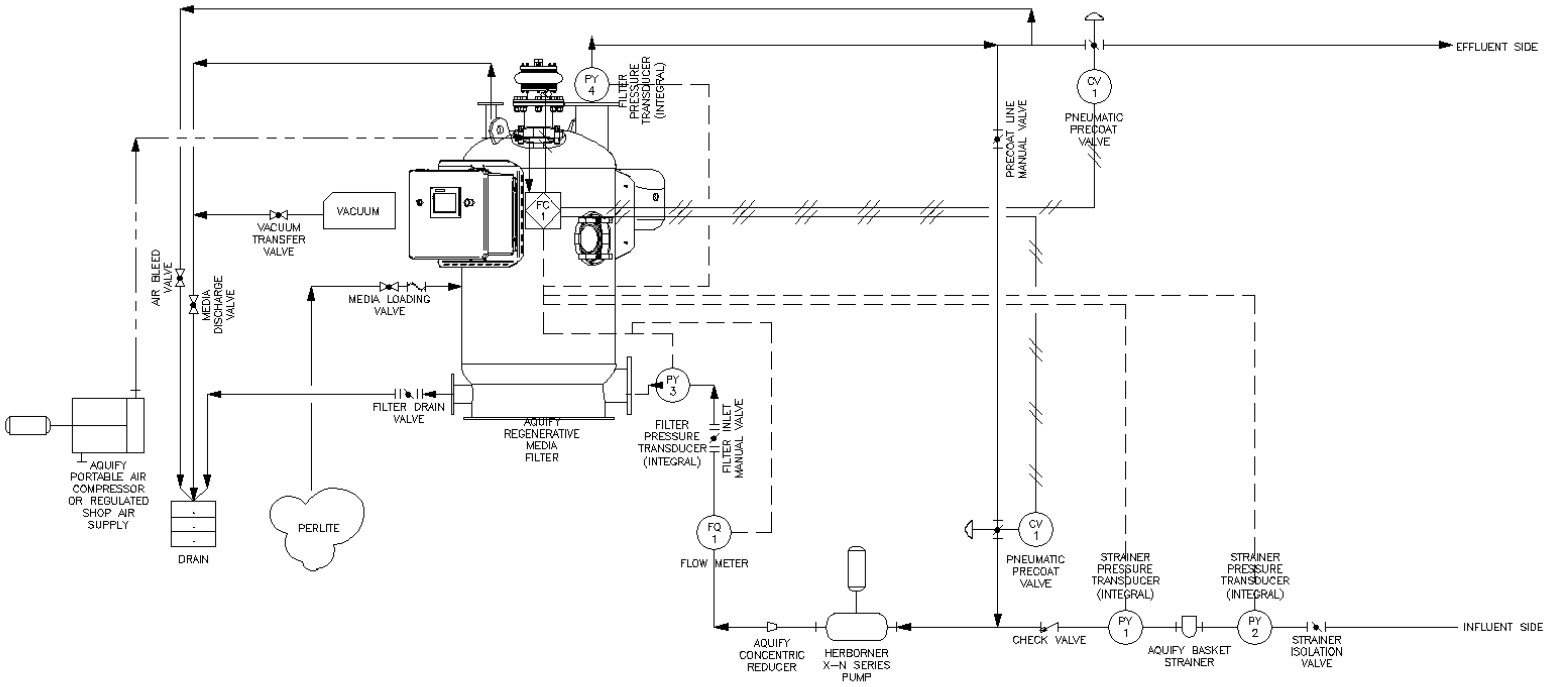
Component Name	Aquify Supplied	Aquify Optional
Regenerative Media Filter	*	
Air Compressor		*
Filter Controller	*	
Vacuum System	*	

Component Name	Aquify Supplied	Aquify Optional
Main Pump		*
Strainer		*
Pump Motor VFD (not shown)		*
Filter Bottom Tee		*
Concentric Reducer		*
Reducing Tee (Precoat Line)		*
Reducing Tee (Precoat-Effluent)		*
Media Loading Valve	*	
Media Transfer Valve	*	
Third Media Change Valve	*	
Drain Valve		*
Influent Shut-Off Valve		*
Air Bleed Valve		*
Pneumatic Valve (Effluent Side)	*	
Pneumatic Valve (Influent Side)	*	
Strainer Isolation Valve		*
Strainer Effluent Check Valve	*	
Flow Sensor (influent)	*	
Filter Influent Pressure Transducer	*	
Filter Effluent Pressure Transducer	*	
SMART Strainer Influent Pressure Transducer		*
SMART Strainer Effluent Pressure Transducer		*
Concentric Reducer Pressure Transducer		*

Component Name	Aquify Supplied	Aquify Optional
Perlite Media	*	
Filter Cleaner		*
Sight Glass		*
Mating Flanges, Gaskets, Flange Hardware		*
Component Mounting Hardware (Concrete Anchor and Bolts)		*

P&ID ROUTING

- *THE FOLLOWING P&ID DOCUMENT IS USED AS A REFERENCE ONLY DOCUMENT FOR PROPER ROUTING AND CONFIGURATION OF THE AQUIFY PMF-FRP SERIES FILTER.*
- *CONSULT A MECHANICAL ENGINEER FOR PROPER SIZING, ROUTING, AND PLACEMENT OF ALL COMPONENTS.*
- *ADDITIONAL FITTINGS AND COMPONENTS (NOT SHOWN) MAY BE REQUIRED FOR PROPER FLOW AND ROUTING, INCLUDING BUT NOT LIMITED TO REDUCERS, FLANGES, TEES, VALVES, AND SENSORS.*
- *PLACE PNEUMATIC VALVE AS CLOSE AS POSSIBLE TO EFFLUENT LINE, AND AS CLOSE AS POSSIBLE TO REDUCING TEE TO AVOID PRECOAT MEDIA DISCHARGE TO SYSTEM.*
- *FOR ANY QUESTIONS REGARDING PROPER INSTALLATION AND OPERATION OF THE FILTER SYSTEM, REVIEW THE AQUIFY PMF-FRP O&M DOCUMENTATION, OR CONSULT AN AUTHORIZED AQUIFY SUPPORT AGENT.*
- *ALL AUXILIARY EQUIPMENT INCLUDING BUT NOT LIMITED TO HEATER OR UV TREATMENT SYSTEMS MUST BE INSTALLED ON THE EFFLUENT LINE.*
- *CHECK VALVE MUST BE INSTALLED BELOW WATER LEVEL IF SELF-PRIMING PUMP IS USED.*
- *(FOR HERBORNER X-SERIES PUMPS) PUMP MUST BE FLOODED (BELOW WATERLINE) TO ENSURE PROPER FLOW.*
- *DO NOT USE WATER-COOLED PUMPS WITH AQUIFY PMF SERIES FILTERS.*
- *(SUMP ONLY) DRAIN VOLUME SHALL BE MINIMUM TWICE THE FILTER TANK VOLUME.*
- *LOWER FLANGE CONNECTORS MAY BE ROTATED IN 90 DEGREE INCREMENTS IF NEEDED.*
- *THREE INCLUDED WELDED ON UNIVERSAL BRACKETS ON FILTER TANK MAY BE USED TO INSTALL VACUUM AND CONTROLLER IF NOT MOUNTED REMOTELY.*


EFFLUENT SIDE
PY 4
FILTER PRESSURE TRANSDUCER (INTEGRAL)
CV 1
PNEUMATIC PRECOAT VALVE
PRECOAT LINE MANUAL VALVE
VACUUM
VACUUM TRANSFER VALVE
FC 1
AIR BLEED VALVE
MEDIA DISCHARGE VALVE
MEDIA LOADING VALVE
FILTER DRAIN VALVE
AQUIFY REGENERATIVE MEDIA FILTER
PY 3
FILTER PRESSURE TRANSDUCER (INTEGRAL)
FILTER INLET MANUAL VALVE
AQUIFY PORTABLE AIR COMPRESSOR OR REGULATED SHOP AIR SUPPLY
DRAIN
PERLITE
FQ 1
FLOW METER
CV 1
PNEUMATIC PRECOAT VALVE
STRAINER PRESSURE TRANSDUCER (INTEGRAL)
STRAINER PRESSURE TRANSDUCER (INTEGRAL)
INFLUENT SIDE
AQUIFY CONCENTRIC REDUCER
HERBORNER X-N SERIES PUMP
CHECK VALVE
PY 1
PY 2
AQUIFY BASKET STRAINER
STRAINER ISOLATION VALVE

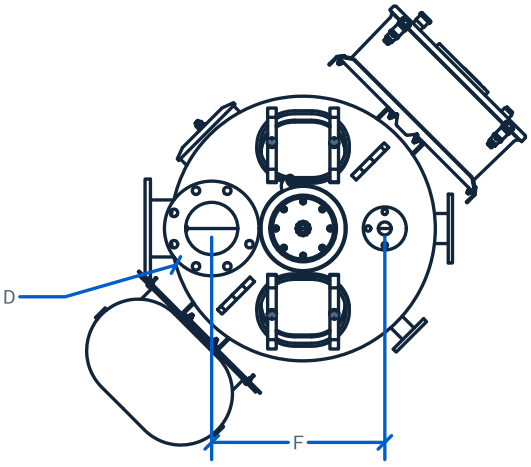
Flowrate Data

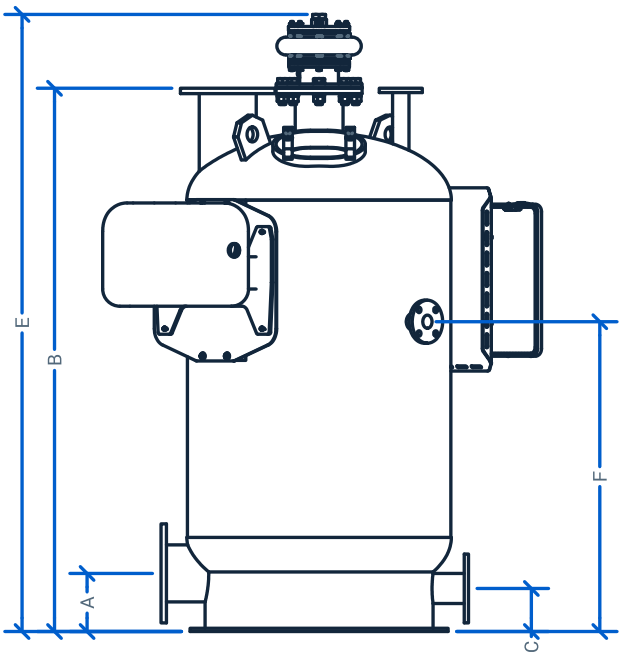
Variables other than pump flowrates should be considered when sizing a filter. The type of pool, total volume, depth, turnover rate, bather load, and location (indoor/outdoor) may impact the selection. Before finalizing a design or purchasing an Aquify Regenerative Media Filter, it is recommended to consult with Aquify Systems to confirm the selected model and auxiliary components are appropriate.

Model	Filter Area	Recommended Flow Rate (GPM)	
	(SF)	Min	Max
PMF-30-100-FRP	100	50	150
PMF-30-200-FRP	200	100	300
PMF-30-300-FRP	300	150	450
PMF-36-400-FRP	400	200	600
PMF-36-500-FRP	500	250	750
PMF-42-600-FRP	600	300	900
PMF-42-700-FRP	700	350	1050
PMF-48-800-FRP	800	400	1200
PMF-48-900-FRP	900	450	1350
PMF-54-1000-FRP	1000	500	1500
PMF-54-1200-FRP	1200	600	1800
PMF-60-1400-FRP	1400	700	2100
PMF-60-1600-FRP	1600	800	2400

NSF Rated to 2.0 GPM/SF

Flanged Connection Locations

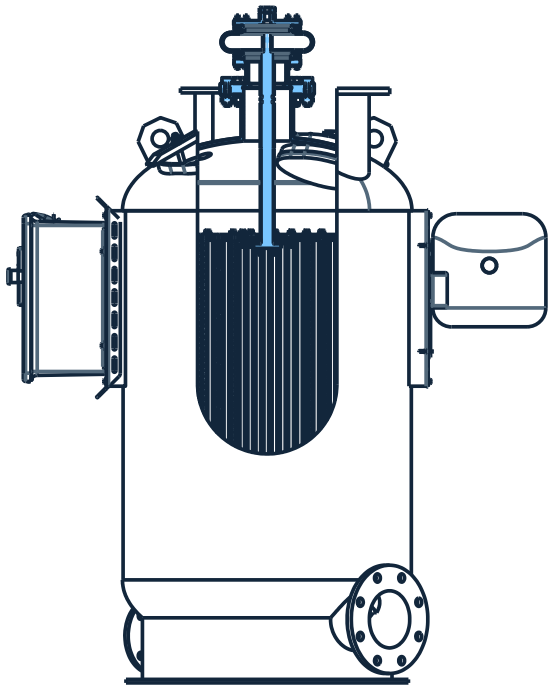




Model	Flange Connections						Dimensions	
	Influent (A)		Effluent (B)		Drain (C)		Width	Height
	Pipe	Center Line	Pipe	Flange Connection	Pipe	Center Line	(D)	(E)
PMF-30-100	6″	6.75″	6″	63.1″	3″	5.0″	30.75″	71.71″
PMF-30-200								
PMF-30-300								
PMF-36-400	6″	6.75″	6″	72.2″	3″	5.0″	36.75″	72.21″
PMF-36-500								
PMF-42-600	8″	8.0″	8″	67.9″	4″	5.75″	42.75″	76.51″
PMF-42-700								
PMF-48-800	8″	9.25″	8″	68.55″	4″	5.5″	48.75″	77.13″
PMF-48-900								
PMF-54-1000	10″	9.25″	10″	79.3″	4″	5.5″	55.14″	79.33″
PMF-54-1200								
PMF-60-1400	12″	10.75″	12″	73.5″	4″	5.75″	61.25″	82.13″
PMF-60-1600								

All connections, diameter, width, and height measured in inches. Connection sizes are subject to change based on GPM requirements. Bushings, pipe connections, and reducers may be supplied to accommodate the required pipe diameters or to mate with existing pipe sizes on site. Refer to filter spec sheets for additional dimensions, and Revit models for accurate pipe placement information.

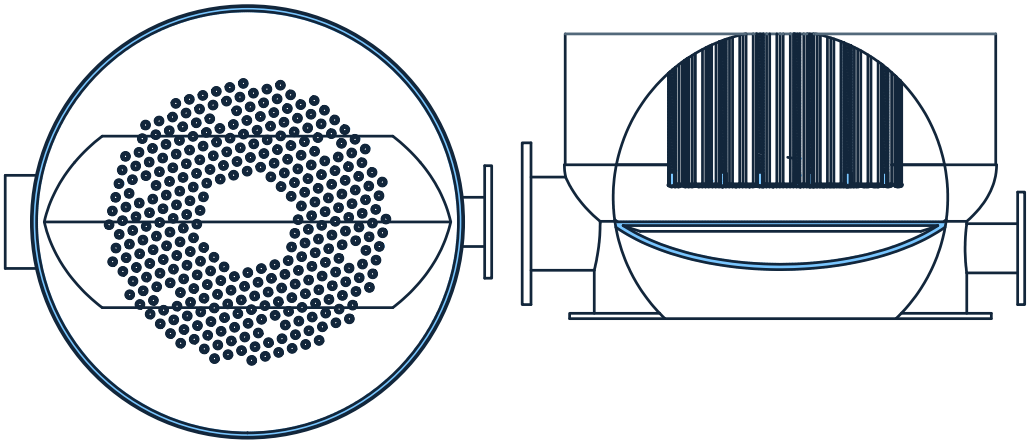
Internal Components



The internal components primarily consist of the flexible tube elements, tube sheet, tube sheet retainer, diffuser, gaskets, and lift shaft. All parts are factory assembled and tested before shipment.

All components are easily accessible for inspection or maintenance via the viewing window or manways.

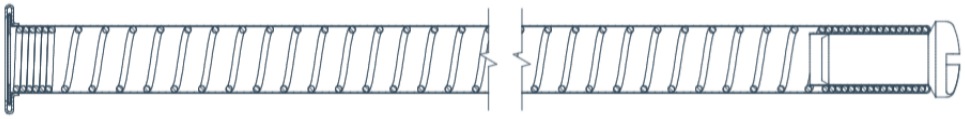
Inlet Diffuser



The inlet diffuser substantially reduces the turbulence inside the tank. By reducing the flow velocity and changing the flow direction, the disturbance at the tank bottom is diminished, thus creating a more uniform flow.

The diffuser is an integral part of the bottom head of the FRP tank sub-assembly. Unlike carbon steel pipe, this material is corrosion resistant and will not pit rust or scale. The inside of the diffuser remains smooth, is inherently self-cleaning, and allows an unobstructed flow of media during clean-out.

Flexible Tube Elements



The flexible tube element uses a superior braided cylinder-shaped filament. Each filter tube element is constructed with an open-ended flange at the top and is closed bottom. The flange portion is used to attach and assemble the filter elements to the tube sheet. Each filament contains a 316 Stainless-Steel spring to diminish any reduction in diameter while maintaining structural integrity. Aquify uses 38" tube elements, which are the optimal tested size to minimize movement and bridging.

Model	Flex Tubes (qty)	Coated Area (SF)
PMF-30-100	162	100 SF
PMF-30-200	324	200 SF
PMF-30-300	486	300 SF
PMF-36-400	648	400 SF
PMF-36-500	809	500 SF
PMF-42-600	971	600 SF
PMF-42-700	1133	700 SF
PMF-48-800	1295	800 SF
PMF-48-900	1457	900 SF
PMF-54-1000	1619	1000 SF
PMF-54-1200	1943	1200 SF
PMF-60-1400	2268	1400 SF
PMF-60-1600	2590	1600 SF

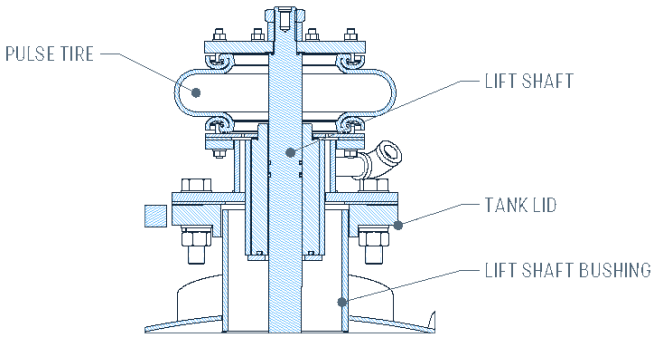
Flexible Tube Element Operation

During the standard filtration cycle, the external pressure reduces the porous filament of the flexible tube element assembly. While the filament is in this permeable state, the precoated perlite media accumulates particulates. Once the optimal flow is impacted and the set differentials are reached, the "pulse" process is activated, enlarging the filaments' pours and conversely propelling the particulates to the bottom of the filter for easy removal. The maximum recommended operating differential is 15-psi. For ease of operation, the filter controller can be programmed to pulse automatically at preset differentials.

Never run the system without the proper amount of perlite. Doing so without any or the right amount could foul elements and cause performance issues and loss of temporary filter area.

Pulse Mechanism

The "pulse" mechanism includes a pneumatically actuated tire externally mounted on top of the filter. Air is added to and exhausted from the pressurized tire, causing the downward and upward movement of the flexible tube element assembly, termed the "pulse."



Pulse Operation

During the "pulse" cycle, the flexible tube elements coated with the media and accumulated particulates, are dislodged then re-coated without the particulates, effectively extending the life of the filter cycle.

The "pulse" can be initiated manually by the operator or automated by activating the actuator, controlled by a 3-way solenoid valve, electronically through the filter controller.

PRESSURE: 90-PSI MAXIMUM

TEMPERATURE: -35°F to +135°F

TOTAL STROKE: 1" – 2"

Over inflation can cause component damage and failure of the system. Never inflate the tire with stops removed. This could result in personal injury.

Media Loading System

Media Loading System Description

The media loading system is provided to ease the discharge of the perlite media into the filter. The vacuum shall include a minimum UL-listed, five HP 120V single phase, 60 Hz motor.

All necessary hardware, fittings, and pipe, including mating electrical connections, are pre-wired into the Aquify Regenerative Media filter controller for final field installation.

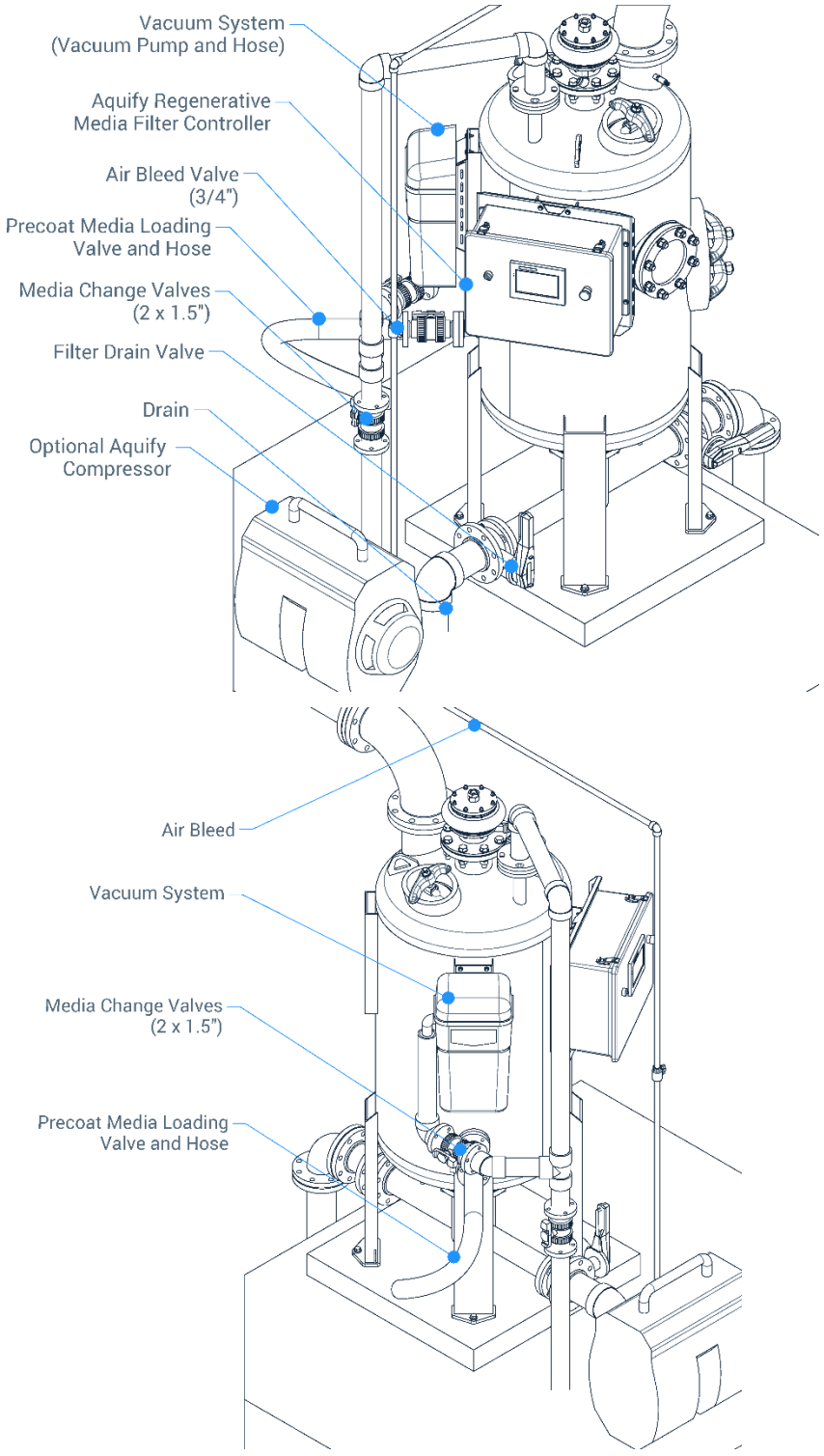
The media loading system is rated for indoor use only. If filter is installed outside, the loading system must be enclosed for protection from natural elements.

Media Loading System Operation & Procedure

Before charging/recharging the media, the system should be free from any obstructions in the piping.

The frequency of the media change can be influenced by the type of pool, chemistry, turnover rate, bather load, and location (indoor/outdoor).

- **With the filter system off, press "Menu"**
- **Press "adding perlite" from the menu screen**
- **Close filter drain valve**
- **Close vacuum drain valve**
- **Close air bleed vent valve**
- **Open media loading hose valve**
- **Open media loading transfer valve**


Vacuum System
(Vacuum Pump and Hose)
Aquify Regenerative
Media Filter Controller
Air Bleed Valve
(3/4")
Precoat Media Loading
Valve and Hose
Media Change Valves
(2 x 1.5")
Filter Drain Valve
Drain
Optional Aquify
Compressor
Air Bleed
Vacuum System
Media Change Valves
(2 x 1.5")
Precoat Media Loading
Valve and Hose

Air Filter Regulator

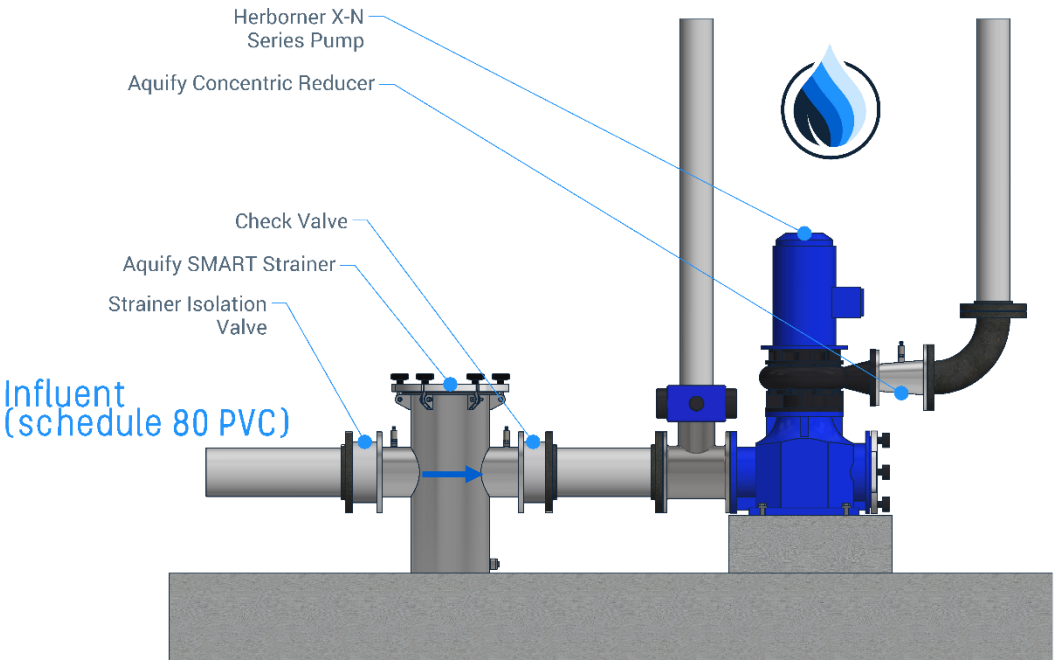
The air filter is used to remove liquid water and particulate matter from compressed air. By straining the air and trapping solids such as dust, dirt, and liquids, the regulator can reduce contaminates and improve the efficiency and performance of the downstream equipment. Optimally the pressure regulator maintains a constant output pressure regardless of variations in the input pressure and downstream flow requirements. During initial installation and configuration of the system, the regulator should be set to 90 psi.

The filter regulator elements should be replaced every two years or when the pressure drops below 0.1 MPa, to prevent any damage.

Plumbing Runs and Equipment Locations

Influent Line

The Influent line consists of the pipe and accessories from the pool, surge tank, or balance tank, including the hair & lint strainer, butterfly, and check valve, reducing tee up through the pump. Commercial applications typically use schedule 80 PVC pipes.



Strainer Isolation Valve

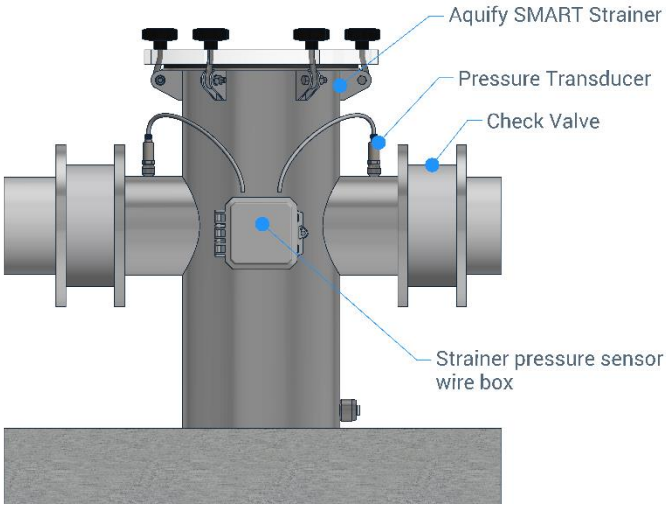
The PVC lever butterfly valve is installed before the hair & lint strainer. During regular operation, this valve remains in the open position and only closed by hand when cleaning the hair & lint strainer.

Basket Strainer

Aquify recommends when designing the pump room, using a straight strainer and an eccentric reducer or tee at the pump suction, rather than a reducing strainer as it will not directly attach to the pump. Before

cleaning the strainer basket, turn off the pump and manually close the isolation butterfly valve. For ease of installation,

Aquify Systems manufactures a SMART strainer, which includes prewired and installed pressure transducers on the influent and effluent side of the strainer, as well as a UL listed waterproof junction box integrated on the strainer body to ease the installation process. For more information on the Aquify Straight Strainer series, as well as the SMART strainer upgrade, please visit the Aquify Systems website or contact an authorized Aquify support representative.



Check Valve

The check valve should be installed on the discharge side of straight strainer. The valve's function prevents water from flowing back into the pool or surge tank during the precoat process and as an isolation valve during routine strainer basket cleaning.

Reducing Tee

Aquify recommends installing an eccentric reducing tee on the influent pipeline to facilitate a proper transition from the pump suction nozzle to the larger diameter pipe. The tee eliminates any trapped air from entering the reducing nozzle of the pump's suction line and increasing flow velocities, leading to friction loss and reduced pump performance.

Flooded Suction Pump

A flooded suction pump is installed below grade and allows the pool to meet turnover requirements.

If a self-priming pump (usually installed for filter at grade or smaller sizes) is used instead of a flooded suction pump, installer must include an additional check valve on the influent line under the water line. Not shown on schematic.

Concentric Reducer

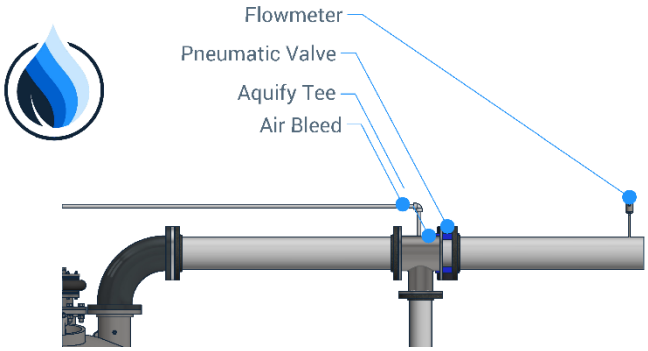
A concentric reducer is required to make up the difference from the effluent flange of the pump and the tank connection (effluent pipe size).

Pump Throttle Valve

A butterfly gear valve is installed after the pump discharge and before the filter. This valve manually controls the flow of water into the filter. With the use of a Variable Frequency Drive (VFD), this manual gear valve shall be in the open position interlocked into the GF Mag Flow Meter will keep a consistent desired flow rate without manual valve requirements.

Effluent Line

The Effluent line consists of the pipe and accessories from the pump discharge to the pool return. Flowmeters, chemicals, heaters, and other disinfection components are installed on this line downstream of the pneumatic effluent valve. Commercial applications typically use schedule 80 PVC pipes.



Effluent

(schedule 80 PVC)

Air Bleed

Either a ¾" or 1" pipe needs to be tapped and threaded into the highest point of the effluent pipe located before the pneumatic effluent valve. It is recommended to tap on a fitting, as shown in the illustration, as the pipe is thicker and easier to thread. The pipe shall be pumped to the drain and have a manual ball valve installed at a chest level. (reference Schematic)

Pneumatic Effluent Valve

The PVC pneumatic butterfly valve is installed right at the precoat down tee. This valve is generally in the open position during filtration and automatically closes during precoat, filter draining, or when the filter is in the off position.

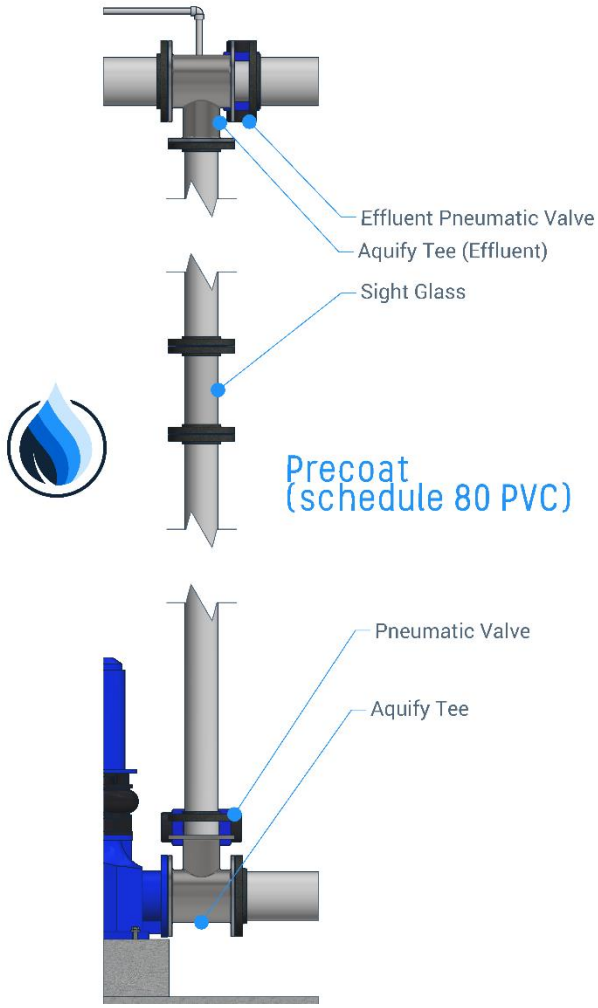
Always ensure that all valves are installed and operating correctly before operating the filter. Pearlite can become discharged to the pool if the pneumatic valves do not operate correctly or seal during the precoat cycle.

Flow Meter

A flowmeter is required to provide an accurate flowrate reading hard-wired into the VFD to maintain a constant flow. (reference VFD manual for interlocking the flowmeter with a 4/20 mA output to the VFD). Aquify includes a magnetic flowmeter with temperature probe with the Aquify Regenerative Media Filter Controller. *For more information refer to the Aquify Regenerative Media Filter documentation.*

Precoat Line

The precoat line is designed to be two pipe diameters sizes smaller than the effluent (return) pipe size. This line makes a closed loop to allow for the perlite to regenerate daily.



Pneumatic Precoat Valve

The PVC pneumatic butterfly valve is installed above the lever valve as low on the pipe as possible. The purpose is to limit the amount of air in the line during precoat. This valve is normally in the closed position during filtration and is automatically opened during precoat, draining filter, or when the filter is in the off position.

Sight Glass

Inline sight glass allows the operator to visually observe if the water is clear before valves automatically adjust during the precoat cycle. The observation pipe is schedule 40 clear PVC pipe with glued on flanges. This piece should be installed in an area that is above the pneumatic valve and easily visible.

Shipping

All shipments will include a packing list, with corresponding parts clearly labeled for ease of identification. Aquify recommends careful inspection of the complete shipment at the time of delivery. Any damage during shipment may impact the functionality of the equipment.

Customer Service Toll-Free (833)-386-2782

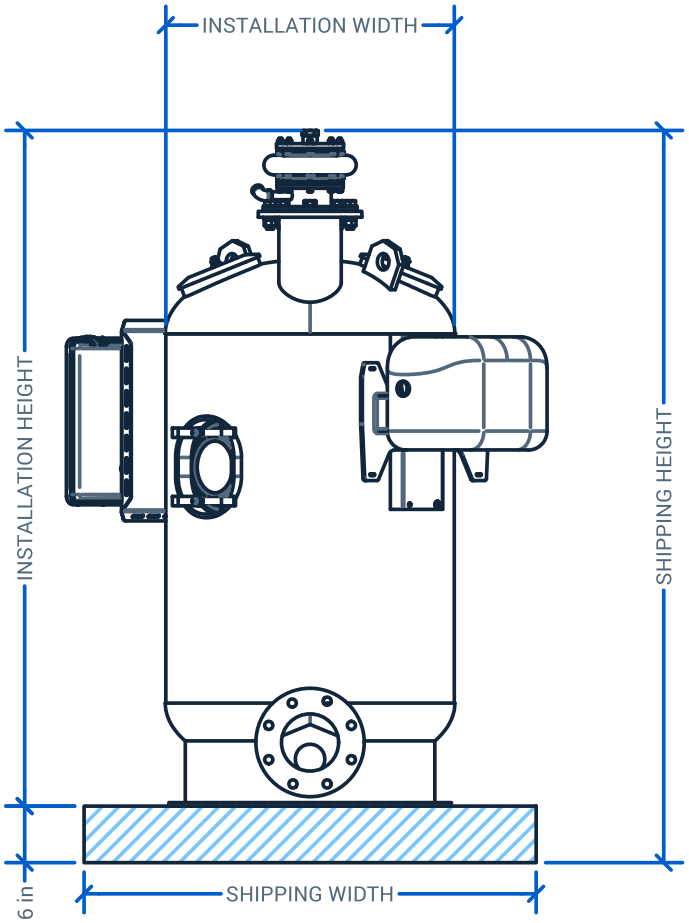
The receiver is responsible for the off-loading of the shipment. All filters are securely bolted to a skid and crated for forklift handling to ensure the safety of the delivery. All accessorial requirements will be confirmed before shipping.

The filter should always be protected from outside elements and other trades in a covered, safe, flat, sturdy location until installation.

Filter must be offloaded & handled in the upright position. Tipping filter for a long period or storing filter on its side can cause internal damage and may void warranty.

Shipping and Installation Weights and Dimensions

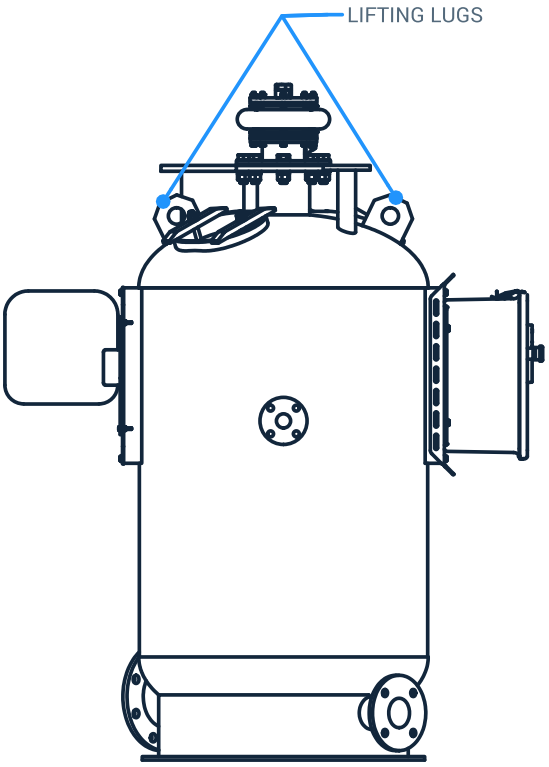
Please note that the dimensions given suggest the minimum required installation dimensions. It is recommended to allow for a buffer to ease the process of installing the filter.



	Shipping			Installation		
Model	**Height**	**Width**	**Weight**	**Height**	**Width**	**Weight**
PMF-30-100-FRP	75	48	1,205	69	31	1,055
PMF-30-200-FRP	75	48	1,250	69	31	1,100
PMF-30-300-FRP	75	48	1,295	69	31	1,145
PMF-36-400-FRP	78	48	1,485	72	37	1,335
PMF-36-500-FRP	78	48	1,535	72	37	1,380
PMF-42-600-FRP	81	60	1,930	75	43	1,780
PMF-42-700-FRP	81	60	2,010	75	43	1,860
PMF-48-800-FRP	84	60	2,430	78	49	2,205
PMF-48-900-FRP	84	60	2,510	78	49	2,285
PMF-54-1000-FRP	87	72	2,725	81	55	2,500
PMF-54-1200-FRP	87	72	2,885	81	55	2,660
PMF-60-1400-FRP	89	72	3,340	83	61	3,115
PMF-60-1600-FRP	89	72	3,500	83	61	3,275

Width and height are measured in inches, and weight is measured in pounds.

Installation



The Aquify Regenerative Media filter contains internal elements that are vertically installed and should always be transported and handled in an upright position. When raising the filter, the lifting lugs should always be used.

If tilting the filter is required for installation purposes, the pulse tire MUST be pressurized to no less than 75-psi, before cleaning the tank. The tire can be pressurized by connecting air to the valve. Once the pressure reaches 75-psi, the valve should be closed. The tank should be tilted and returned to the upright position as soon as possible. Internal damage could occur; therefore, pulse the filter several times to confirm this function is operating correctly.

Installing the filter in a closed, well-ventilated location is preferred. The filter can be installed outdoors; however, all pneumatic and electrical components such as the actuators, media loading system, and the filter controller must be enclosed and protected from any external elements. This helps ensure the

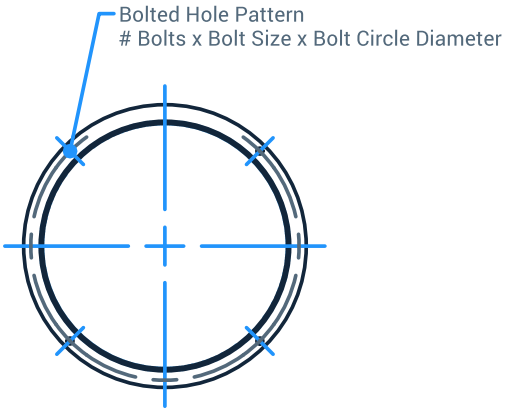
longevity of the system and decrease future repairs. Please contact Aquify Systems with any questions

Aquify Systems standard supplied compressor is not rated for outdoor installation. Installing compressor outdoors without consulting with Aquify Systems can cause failure, potential electrocution, and will void warranty.

Positioning

Before moving the Aquify Regenerative Media Filter, the path should be free from all obstructions. Inspect the installation area, confirm the floor is level with ample additional space to install all plumbing, and the ceiling height meets minimum clearance to ensure adequate room for future maintenance. Attention must be paid to the influent flange (lower front), effluent flange (top), and drain flange (lower back) locations and elevations. Once verified, chalk lines should be drawn for positioning. Please review the installation schematic for plumbing guidelines.

Foundation Footprint



Model	# Bolts	Bolt Size	Bolt Diameter
PMF-30-XXX-FRP			
PMF-36-XXX-FRP			
PMF-42-XXX-FRP			
PMF-48-XXX-FRP			
PMF-54-XXX-FRP			
PMF-60-XXX-FRP			

Make sure filter is level before anchoring. Failure to do so can cause internal damage and may void warranty.

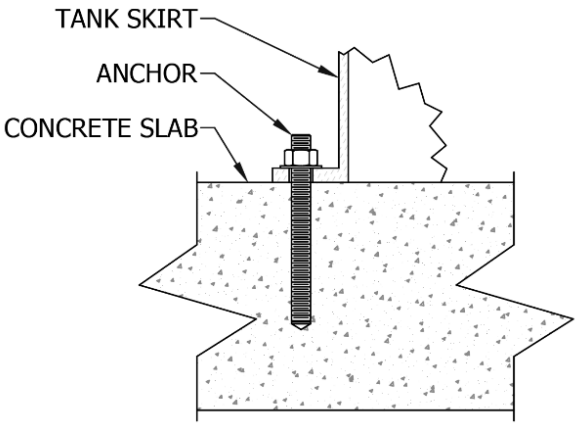
Operating Weight

SMART Part Number	Tank Volume (gal)	Operating Weight	Dry Weight
PMF-30-100-FRP	155 gal	1708 lbs	420 lbs
PMF-30-200-FRP	155 gal	1753 lbs	465 lbs
PMF-30-300-FRP	155 gal	1798 lbs	510 lbs
PMF-36-400-FRP	225 gal	2470 lbs	600 lbs
PMF-36-500-FRP	225 gal	2510 lbs	640 lbs
PMF-42-600-FRP	315 gal	3399 lbs	785 lbs
PMF-42-700-FRP	315 gal	3479 lbs	865 lbs
PMF-48-800-FRP	430 gal	4607 lbs	1020 lbs
PMF-48-900-FRP	430 gal	4687 lbs	1100 lbs
PMF-54-1000-FRP	550 gal	5877 lbs	1290 lbs
PMF-54-1200-FRP	550 gal	6037 lbs	1450 lbs
PMF-60-1400-FRP	700 gal	7538 lbs	1715 lbs
PMF-60-1600-FRP	700 gal	7698 lbs	1875 lbs

All weights measured in pounds

It is essential when designing the house-keeping pad or foundation that the approximate weight of the tank filled with water, "operating weight" is taken into consideration. Aquify Systems recommends consulting a structural architect or engineer.

Anchoring



Once Aquify Regenerative Media filter is positioned in the final location, confirm filter is level then:

1. Drill into concrete 3.5" deep using a ½" concrete drill bit
2. Remove all concrete debris from holes
3. Place washers and nuts on anchor and insert anchor through the tank skirt plate into the hole
4. Ensure anchors are placed thoroughly into the hole without damaging the threads
5. Tighten bolts to 120 pounds

Failure to properly bolt filter to concrete floor with the supplied seismic anchors per instructions can cause filter to tip over. This may damage the filter or cause bodily injury, possibly resulting in death.

Flange Connections

Typical Bolt Torqueing

Flange Size (NPS)	Torque (ft-lbs)
½ – 1-½	12
2-4	25
5	30
6-8	40
10	64
12	95
14-24	110

Flanges are used extensively for connections where removable system components are desired. Aquify Systems has designed the flanged system for functionality and interchangeability. All filter flanges are industry standard, used for periodic system servicing, anticipated system modification or add-ons, connecting any industrial butterfly valves, and temporary component hookups. A manway is installed for ease of future maintenance to access tank internals.

All gaskets are full faced, made from an elastic polymer, with a Shore "A" Durometer of approximately 60. Standard gaskets are 1/8" thick but can range up to ½" thick. It is recommended that gaskets are periodically checked for any corrosion that could allow leakage.

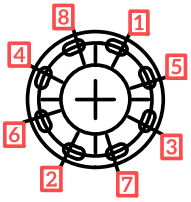
Bolt torque recommended requirements are shown below. Threads should be clean and well lubricated. Actual field conditions may require variations in these recommendations.

Unnecessary over-torqueing will damage the flange. All manufacturers are slightly different. It is best to reference manufacturers technical data sheet before installing.

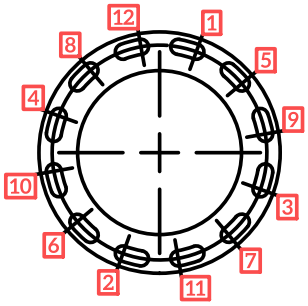
Bolt Pattern Sequence

Bolts should be tightened in a 180-degree opposing pattern.
The recommended bolt torque sequence is shown below.

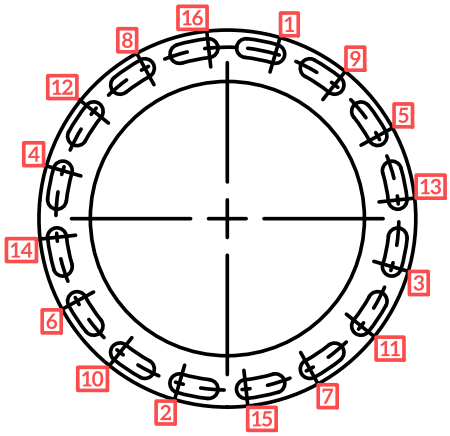
4 Bolt



8 Bolt



12 Bolt



16 Bolt

PVC Pipe

PVC Pipe Support Spacing

Adequate pipe support is essential for a durable and adequately functioning piping system. Without the support it needs, piping systems incur stress and sag that lead to degradation and break down.

Several factors go into calculating the amount of support each system needs and several formulas and techniques used to determine this. Support needs will vary from system to system based on configuration, pipe size, load, and temperature.

Additional items to consider are valves and other points of extra load. These components should be supported separately from the pipe spacing. Other considerations include atmospheric pressure, which can expand or contract the pipe. Clamps and additional supports can be applied to mitigate this fluctuation.

NPT Pipe Size (in)	PVC Pipe Support Spacing (Ft)								
	Schedule 40 Temperature (F)					Schedule 80 Temperature (F)			
	60	80	100	120	140	60	80	100	120
1/4	4	3.5	3.5	2	2	4	4	3.5	2.5
3/8	4	4	3.5	2.5	2	4.5	4.5	4	2.5
1/2	4.5	4.5	4	2.5	2.5	5	4.5	4.5	3
3/4	5	4.5	4	2.5	2.5	5.5	5	4.5	3
1	5.5	5	4.5	3	2.5	6	5.5	5	3.5
1-1/4	5.5	5.5	5	3	3	6	6	5.5	3.5
1-1/2	6	5.5	5	3.5	3	6.5	6	5.5	3.5
2	6	5.5	5	3.5	3	7	6.5	6	4
2-1/2	7	6.5	6	4	3.5	7.5	7.5	6.5	4.5
3	7	7	6	4	3.5	8	7.5	7	4.5

NPT Pipe Size (in)	PVC Pipe Support Spacing (Ft)								
	Schedule 40 Temperature (F)					Schedule 80 Temperature (F)			
	60	80	100	120	140	60	80	100	120
4	7.5	7	6.5	4.5	4	9	8.5	7.5	5
6	8.5	8	7.5	5	4	10	9.5	9	6
8	9	8.5	8	5	4.5	11	10.5	9.5	6.5
10	10	9	8.5	5.5	5	12	11	10	7
12	11.5	10.5	9.5	6.5	5	13	12	10.5	7.5
14	12	11	10	7	5.5	13.5	13	11	8
16	12.5	11.5	10.5	7.5	6.5	14	13.5	11.5	8.5

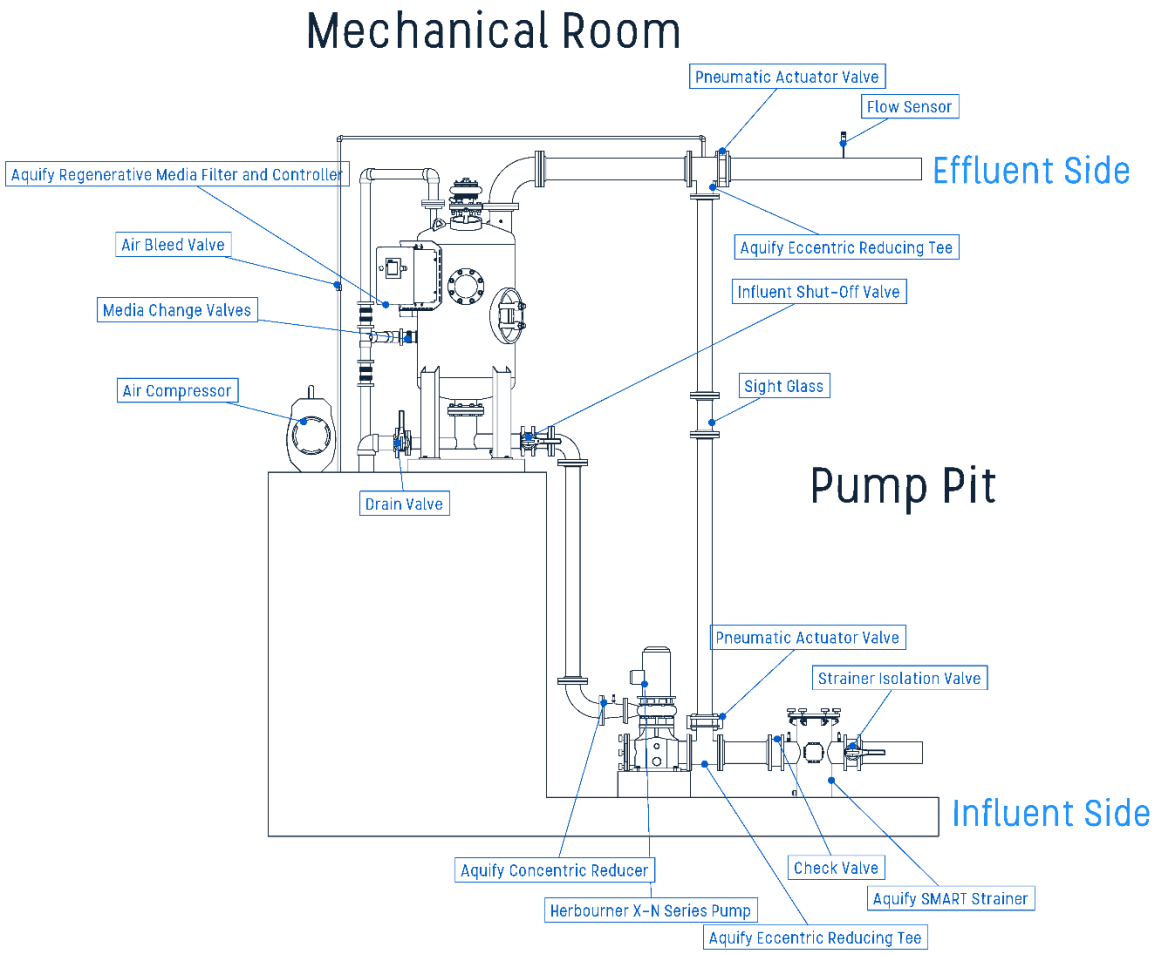
Pipe Sizing

PVC Schedule (abbrev. SCH or Sch) is the thickness of the PVC pipe wall. The most common is Sch 80 in commercial applications; however, Sch 40 PVC is also available and sometimes approved by designers. The significant differences between Sch 40 and Sch 80 piping are water pressure rating, color, application, and sizing. As the schedule gradually increases, so does the wall thickness; however, the diameter of the pipe will remain the same. Although Sch 80 will have a slightly more restrictive flow, due to the decrease in size of the inside hole (bore), the piping can be used interchangeably (this is not recommended).

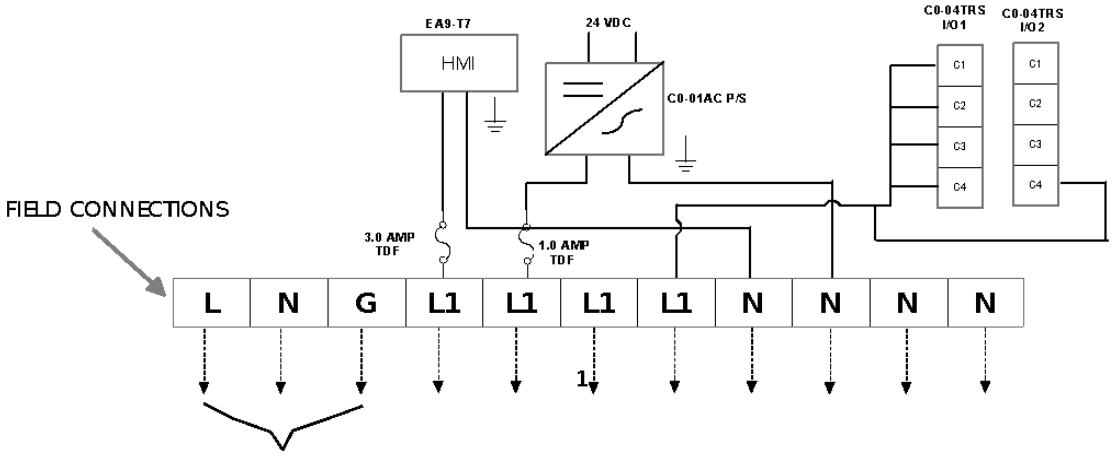
Certain states might allow for slightly higher flows. The following figures are considered best practices and in line with the Model Aquatic Health Code (MAHC).

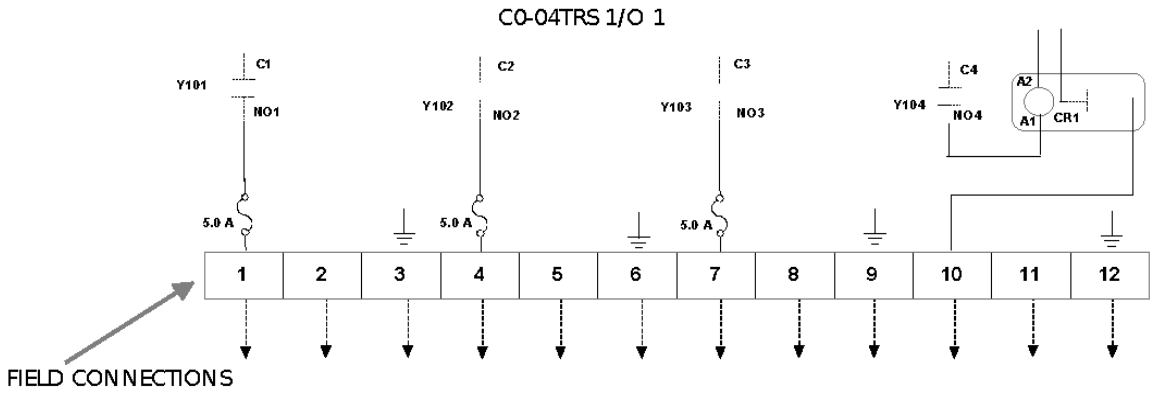
NPT Pipe Size	Maximum GPM Flow					
	SCH 40 PVC Pipe			SCH 80 PVC Pipe		
	6FPS Suction	10FPS Pressure	3FPS Gravity	6FPS Suction	10FPS Pressure	3FPS Gravity
1	16	26	8	13	22	6
1-1/2	38	63	19	32	53	16
2-4	62	103	31	54	90	27
2-1/2	88	146	44	77	128	39
3	136	227	68	121	201	60
4	235	391	117	211	351	105
6-8	534	890	267	479	799	240
8	936	1544	463	841	1401	420
10	1462	2436	731	1324	2206	662
12	2076	3460	1038	1874	3123	937
14	2510	4183	1255	2263	3771	1131
16	3277	5461	1638	2972	4953	1486

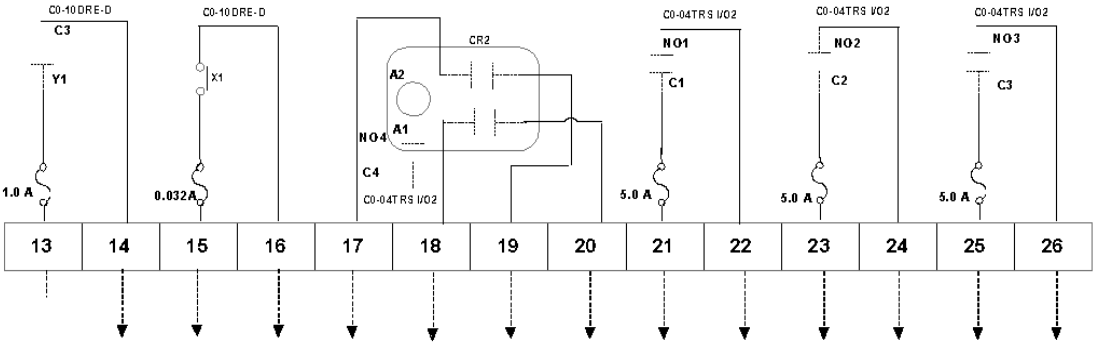
Schematics

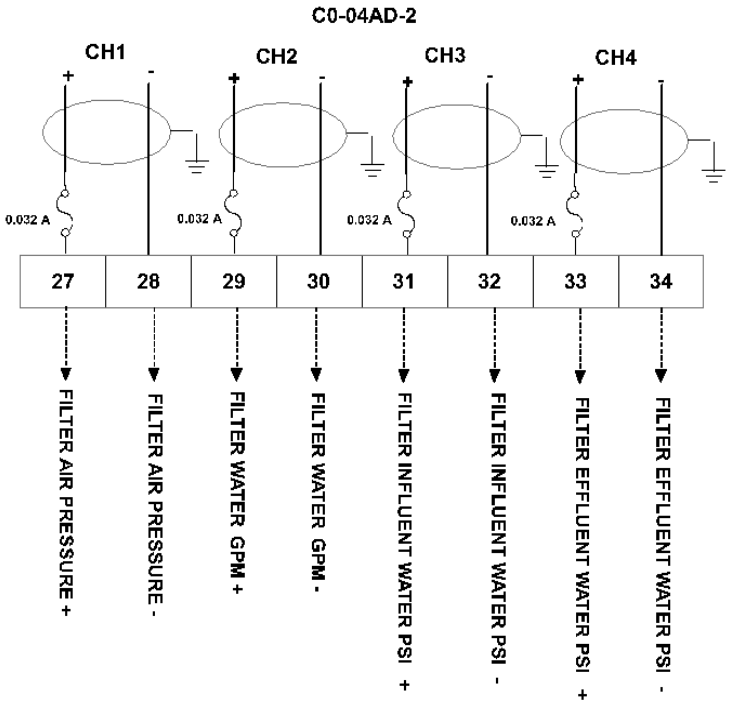

Mechanical Room
Pneumatic Actuator Valve
Flow Sensor
Effluent Side
Aquify Regenerative Media Filter and Controller
Air Bleed Valve
Aquify Eccentric Reducing Tee
Media Change Valves
Influent Shut-Off Valve
Air Compressor
Sight Glass
Pump Pit
Drain Valve
Pneumatic Actuator Valve
Strainer Isolation Valve
Influent Side
Aquify Concentric Reducer
Check Valve
Aquify SMART Strainer
Herbourner X-N Series Pump
Aquify Eccentric Reducing Tee

Wiring Diagrams








C0-04AD-2
CH1
CH2
CH3
CH4
+
-
0.032 A
27
28
29
30
31
32
33
34
FILTER AIR PRESSURE +
FILTER AIR PRESSURE -
FILTER WATER GPM +
FILTER WATER GPM -
FILTER INFLUENT WATER PSI +
FILTER INFLUENT WATER PSI -
FILTER EFFLUENT WATER PSI +
FILTER EFFLUENT WATER PSI -

Designer Plan Criteria

Model	Manufacturer	Brand	Description
PMF-30-100-FRP	Aquify Systems	Regenerative Media Filter	100 SF, 8 lbs. Perlite Media, 50 to 150 GPM Max Flowrate
			6" Tank Connections, 3" Drain, 155 gal Tank Volume, NSF 50
PMF-30-200-FRP	Aquify Systems	Regenerative Media Filter	200 SF, 16 lbs. Perlite Media, 100 to 300 GPM Max Flowrate
			6" Tank Connections, 3" Drain, 155 gal Tank Volume, NSF 50
PMF-30-300-FRP	Aquify Systems	Regenerative Media Filter	300 SF, 24 lbs. Perlite Media, 150 to 450 GPM Max Flowrate
			6" Tank Connections, 3" Drain, 155 gal Tank Volume, NSF 50
PMF-36-400-FRP	Aquify Systems	Regenerative Media Filter	400 SF, 32 lbs. Perlite Media, 200 to 600 GPM Max Flowrate
			6" Tank Connections, 3" Drain, 225 gal Tank Volume, NSF 50
PMF-36-500-FRP	Aquify Systems	Regenerative Media Filter	500 SF, 40 lbs. Perlite Media, 250 to 750 GPM Max Flowrate
			6" Tank Connections, 3" Drain, 225 gal Tank Volume, NSF 50
PMF-42-600-FRP	Aquify Systems	Regenerative Media Filter	600 SF, 48 lbs. Perlite Media, 300 to 900 GPM Max Flowrate
			8" Tank Connections, 4" Drain, 315 gal Tank Volume, NSF 50

PMF-42-700-FRP	Aquify Systems	Regenerative Media Filter	700 SF, 56 lbs. Perlite Media, 350 to 1050 GPM Max Flowrate
			8" Tank Connections, 4" Drain, 315 gal Tank Volume, NSF 50
PMF-48-800-FRP	Aquify Systems	Regenerative Media Filter	800 SF, 64 lbs. Perlite Media, 400 to 1200 GPM Max Flowrate
			8" Tank Connections, 4" Drain, 430 gal Tank Volume, NSF 50
PMF-48-900-FRP	Aquify Systems	Regenerative Media Filter	900 SF, 72 lbs. Perlite Media, 450 to 1350 GPM Max Flowrate
			8" Tank Connections, 4" Drain, 430 gal Tank Volume, NSF 50
PMF-54-1000-FRP	Aquify Systems	Regenerative Media Filter	1000 SF, 80 lbs. Perlite Media, 500 to 1500 GPM Max Flowrate
			10" Tank Connections, 4" Drain, 550 gal Tank Volume, NSF 50
PMF-54-1200-FRP	Aquify Systems	Regenerative Media Filter	1200 SF, 96 lbs. Perlite Media, 600 to 1800 GPM Max Flowrate
			10" Tank Connections, 4" Drain, 550 gal Tank Volume, NSF 50
PMF-60-1400-FRP	Aquify Systems	Regenerative Media Filter	1400 SF, 112 lbs. Perlite Media, 700 to 2100 GPM Max Flowrate
			12" Tank Connections, 4" Drain, 700 gal Tank Volume, NSF 50
PMF-60-1600-FRP	Aquify Systems	Regenerative Media Filter	1600 SF, 128 lbs. Perlite Media, 800 to 2400 GPM Max Flowrate
			12" Tank Connections, 4" Drain, 700 gal Tank Volume, NSF 50

General Notes

- Recommended Filter range between 0.5 – 1.5 GPM/SF
- Backwash volume is calculated as 2 x tank volume
- Precoat line is (2) pipe sizes smaller than filter effluent (return) line
- Connection sizes are subject to change based on GPM requirements
- Contact the Aquify Systems design team for any questions on sizing or design integration.

Maintenance

A second tank volume drain-out is recommended to remove spent media during a precoat cycle. The pump is started via the control panel, which fills the tank with water. Manually pulse the filter 3-5 times, then open the tank drain.

For optimum performance of the filter, it is important to do routine maintenance on the filter system. Over time, oils and grease can adhere to the flexible tubes and create bald spots, which will reduce the overall surface area of the media. Aquify System's NSF 50 approved Enzyme cleaner restores the flex tubes, tank, and other internal components back to like-new condition.

Maintenance Procedures

Starting Filter

1. Press the “Filter On” button.
2. The filter pump starts.
3. Motor VFD sends a pump running the signal back.
4. After 5 seconds, the filter precoat valve opens.
5. Close media vent drain valve when the air stops, and water exits.
6. Close air bleed vent valve when the air stops, and water exits.
7. The filter will operate in precoat for 10 minutes.
8. In 10 minutes, the perlite media will be coated to the filter tubes.
9. The filter effluent valve will open once the precoat cycle is complete.
10. The filter is now in filter mode and will remain running until a pulse is initiated, or “Filter Off” is pressed.

Adding Perlite to Filter

The required amount of media to add can be found on the data plate attached to the filter body. The filter must be empty of all water before adding pearlite to the filter.

1. With the filter system off, press “Menu.”
2. Press “Adding Perlite” from the menu screen
3. Close the filter drain valve.
4. Close the vacuum drain valve.
5. Open the air bleed vent valve.
6. Open the media loading hose valve.
7. Open the media loading transfer valve.
8. Press the “Vacuum On” button.
9. Vacuum in the required amount of perlite.
10. Press the “Vacuum Off” button.
11. Close media loading hose valve.
12. Close media loading transfer valve.
13. Open media vent drain halfway.
14. Open the air bleed vent valve halfway.
15. Press the “Home” button on the controller.

Product Description

Perlite, manufactured from perlite ore, an igneous mineral, is an excellent filtration media due to its high porosity. When a particle of perlite ore is heated to approximately 2400°F, the aluminum silicate becomes a molten liquid glass that expands explosively due to the intrinsic moisture present within the particle. The expanded perlite is then milled and separated into various grades. When perlite is applied to the filaments of the flexible tube elements, it forms a low-density, highly porous filter cake that is ideal for separation in applications with a substantial number of solids such as oil and dirt up to one (1) micron in size. Only NSF 50 tested perlite is to be used.

Using Precoat Media

The pressure differential for an unconditioned filter, operated at a flow rate of 2-GPM per square foot of filter element area, can be as low as 1.75-psi. After the elements have been coated, the used media has

been removed, the tank has been cleaned, then new media is added, and the precoat established, the filter elements are now "conditioned" for regular operation. The average pressure differential for a conditioned filter should stabilize at 3 to 5-psi for perlite, and 4 to 6-psi if, using DE. During testing, head loss numbers for a cleaned and freshly precoated filter were measured at 4.26-psi for perlite and 5.50-psi for DE. If pressure differentials are greater than 5.25-psi for perlite and 7-psi for DE are observed at any time after new media has been added, please refer to the *Troubleshooting Section* for Higher Pressure Differentials, due to a new media change. A filter cleanser is also recommended, which will allow for optimal energy savings.

The pressure differential can be obtained by subtracting the effluent pressure from influent pressure reading. Over time, during regular operation, the differential will increase due to the perlite absorbing particulates (dirt, oils, etc.), making it difficult for the water to flow through the coated flexible tube elements.

For optimal filtration performance and the most significant energy savings, it is recommended to pulse daily. The filter controller should automate this function. The daily pulse regenerates the perlite, rearranging the precoat layer and refreshing the outer layer to trap the particulates in the water and lower the differential. When a daily pulse is performed, and the pressure differential is consistently 10-psi higher than the normal recorded pressure, it is time to change the media.

The pressure differential should never reach 15 PSI or higher. Change media at 10 PSI (recommended pressure). Exceeding these pressure differentials may damage the tube elements and void the warranty on the filter.

DE Use

For best performance, the Aquify Regenerative Media filter should be used with Pearlite media; however, DE (diatomaceous earth) for precoat media filters may be used. If DE is used instead of pearlite media, twice as much media must be used to build the precoat cake layer.

Pulse Mode

Any of the following can initiate pulse mode:

a. Manually pressing the “Auto Pulse” button.
b. Scheduling through the auto pulse time close, or.

c. Through pressure differential.

It is recommended that a pulse cycle be performed at least once a day.

Automatic Pulse Setup

Auto pulse can be scheduled to automatically pulse once a day.

1. With the filter controller off, press “Menu.”
2. In the menu screen, press “Pulse Setup.”
3. Press desired day to schedule pulse
4. Enter time in hours and minutes using 24-hour clock

Drain & Rinse Filter

1. With the filter controller off, press “Menu.”
2. In the menu screen, press “Drain and Rinse.”
3. Close pump throttle valve (if below grade)
4. Pulse filter 5 times using the manual pulse button
5. Open filter drain valve
6. Open media vent drain valve halfway
7. Close filter drain valve once the filter is empty
8. Open pump throttle valve (if required)
9. Press the “Filter On” button on the controller to turn on the pump
10. A few seconds after the water passes the viewing window press “Filter Off” on the controller
11. Repeat steps 3-5
12. Press “Menu”
13. In the menu screen press “Adding Perlite.”

Replacement Parts

Replacement Parts for Pulse Filter

Movable parts will eventually fail due to constant wear. Mechanical seals should be replaced every 5 years per Aquify System's maintenance recommendation. This kit contains (1) bushing O-ring, (3) shaft O-rings, (1) replacement bushing. Please refer to the assembly diagrams chart near the end of this document for a complete list of available parts.

Ordering Replacement Perlite

The performance of the Aquify Regenerative Media filter can be significantly affected by the quality of media purchased and the frequency at which the media is changed. Upon installation, once media is first introduced, the internal filter elements are in an unused or "unconditioned" state.

Model	Media Weight (lb)
PMF-30-100	8
PMF-30-200	16
PMF-30-300	24
PMF-36-400	32
PMF-36-500	40
PMF-42-600	48
PMF-42-700	56
PMF-48-800	64
PMF-48-900	72
PMF-54-1000	80
PMF-54-1200	96
PMF-60-1400	112
PMF-60-1600	128

- With filter controller off, press menu
- In the menu screen, press drain media
- Close pump discharge valve
- Pulse the filter 3 to 5 times using the manual pulse button
- Open tank drain valve
- Open vacuum drain valve halfway
- Close tank drain valve once the filter is empty
- Open pump discharge valve
- Press the start button to start pump
- Once the water passes the viewing window, three seconds later press stop
- Repeat steps 1 to 5
- Press Menu
- In the Menu screen press add media

For best results, use only *Aquify Regenerative Media Filter Perlite*. NSF approved perlite may be used if Aquify Regenerative Media Filter Perlite is not availible.

Aquify Part Number:
PMP-25 | Aquify Regenerative Media Filter Perlite – 25 lb

Ordering Replacement Cleaner

Model	Cleaner Required (gal)
PMF-30-100	1
PMF-30-200	2
PMF-30-300	2
PMF-36-400	3
PMF-36-500	3
PMF-42-600	4
PMF-42-700	4
PMF-48-800	5
PMF-48-900	5
PMF-54-1000	8
PMF-54-1200	8
PMF-60-1400	10
PMF-60-1600	10

- ✔ Pulse/drain the old media
- ✔ Refill, pulse, rinse and drain a second time
- ✔ Refill again and add the cleaner while refilling
- ✔ Vent the filter; foaming will occur
- ✔ Let the elements soak for about 12 hours occasionally and then pulse, to create agitation, infiltration into the elements, and a good mix
- ✔ Drain the filter
- ✔ Refill, rinse, and drain 2 times
- ✔ Extra rinses may be necessary when using DE media
- ✔ Precoat and resume operation

For best results, use 1 gallon per 100 gallons of water. Use only *Aquify Regenerative Media Filter Cleaner*.

Aquify Part Number:
PMC-1 | Aquify Regenerative Media Filter Cleaner – 1 gal
PMC-5 | Aquify Regenerative Media Filter Cleaner – 5 gal

Tube Sheet Access

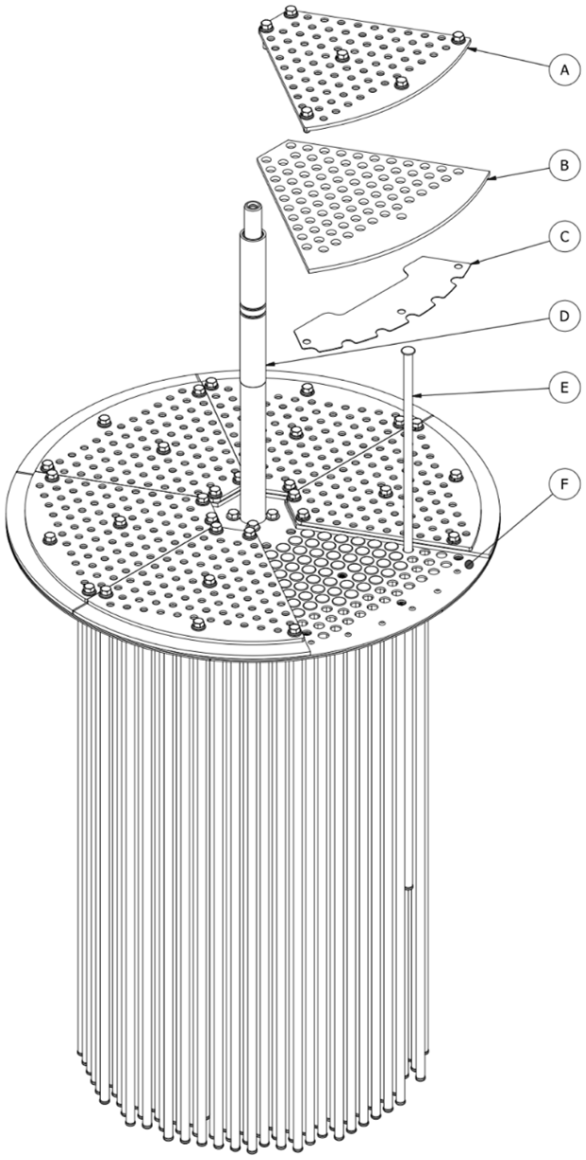
The Aquify Regenerative Media filter is designed with a built-in automatic cleaning mode. If installed and maintained correctly, the filter tube sheet may never have to be examined. To access the tube sheet or tube elements:

- ✔ Drain filter
- ✔ Remove man-way doors
- ✔ Optional: deflate pulse tire
- ✔ Optional: remove pulse tire

In the unlikely event that regular cleaning procedures fail to reestablish proper filtration performance, it may be necessary to inspect parts of the tube sheet or other internal components for potential irregularities. The following instructions and images illustrate how to access these components.

Do not attempt these procedures unless advised to do so by Aquify Systems. Failure to consult with trained professionals could result in equipment failure or personal injury.

All tube sheet components are affixed to the tube sheet base (item "**F**," below). The tube sheet is assembled in 6 equal pie-sections, which may be accessed and disassembled, one section at a time, from the top tank manways. Removing the gasket retaining plate **(A)** permits inspection or change-out of the tube sheet gasket **(B)**, restrictor plates **(C),** and the tube elements **(E)**. Some filter models may not require restrictor plates. The tube sheet base **(F)** is fabricated with integral nuts on the underside, meaning that, tube sheet fasteners can be removed entirely and re-installed without wrench access to the underside of the tube sheet assembly. The lift shaft **(D)** is not equipped with integral nuts or threaded mounting holes, thus, requiring wrench access via the top and side manway doors. It is improbable that the lift shaft would ever need to be removed.


A
B
C
D
E
F

TROUBLESHOOTING

Low Air Pressure

The system air compressor should be 120-psi. The filter air regulator should be set for 90-psi. The low air psi setting is set a 50-psi. If the air psi drops below 50-psi, the filter controller will shut off. Check the air compressor for pressure and operation.

Filter Pump Not Running

Once there is a start signal sent to the motor VFD, a return running signal must be made within five (5) seconds. If no return signal is present, the filter controller will shut down. Check pump and motor VFD.

Influent Pressure Sensor Error

This error indicates that there is no reading or sensor is out of range. Check sensor.

Effluent Pressure Sensor Error

This error indicates that there is no reading or sensor is out of range. Check sensor.

Water Leaking from the Pulse Tire

If water is leaking out of the pulse tire during pulse or normal operation, then the O-rings need to be replaced. Contact Aquify Systems for replacement parts. Part numbers can be located on the Equipment Maintenance List.

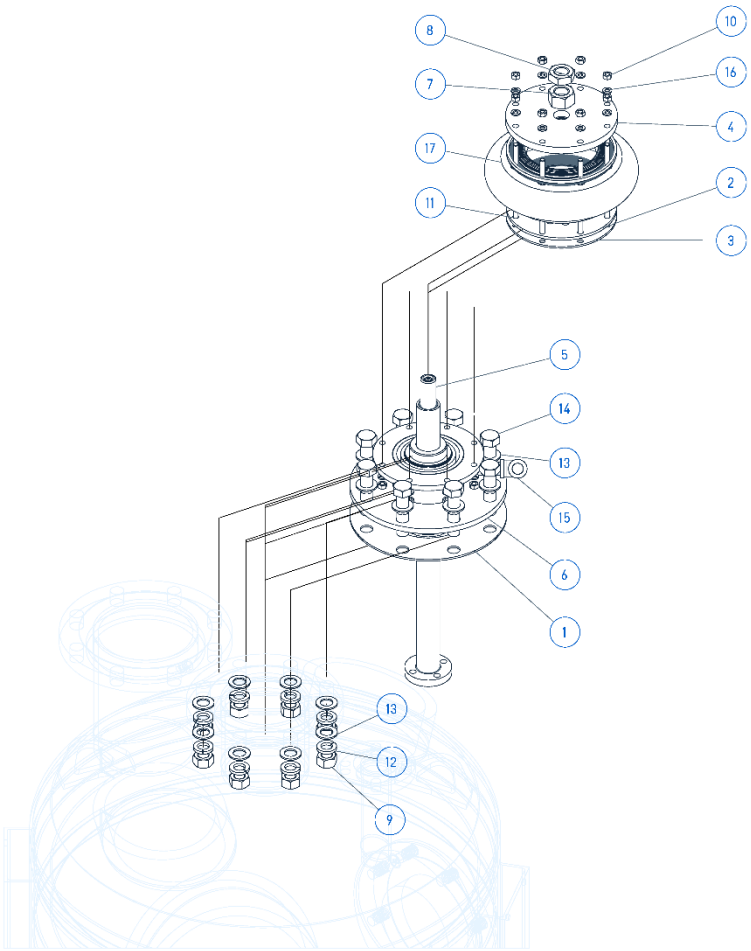
High-Pressure Differential with New Media

When changing the media, if the pressure differential is higher than usual, please check the following:

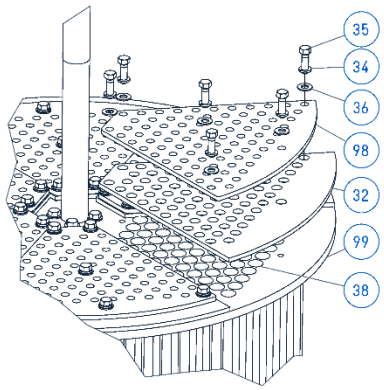
1. The approved IMERYS Aquapearl NSF 50 perlite media was used
2. Oils may have partially coated the elements, creating void spots. This will create square footage loss which will impact performance

Both options will require a precoat media filter purge and replacement media. Please see the corresponding instructions for these operations.

APPENDIX A: ASSEMBLY DIAGRAMS



Pulse Assembly



Tube Sheet

Aquify Systems
10550 Plano Rd
Dallas, TX 75238

1.833.386.2782
www.aquifysystems.com