

MODEL **AFD**
AUTOMATIC FLOCCULANT DISPENSER

INSTALLATION, OPERATION & MAINTENANCE MANUAL

MAFD16.01

Your Serial No.

Fxxxx-yyyy

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SAFETY FIRST!

High voltage and rotating parts can cause serious or fatal injury. Safe installation, operation and maintenance **MUST** be performed by **qualified personnel only**. Familiarization with and adherence to NEMA MG2, the National Electric Code and local codes is recommended.

It is important to observe ALL safety precautions to protect personnel from possible injury.

EVERY DAY, prior to use, make sure ALL Safety Guards are in place and properly secured to the equipment.

EVERY DAY, prior to use, inspect ALL Safety Stickers and **CLEAN** or **REPLACE** if covered or damaged.

	WARNING! FAILURE TO OBSERVE SAFETY PRECAUTIONS COULD CAUSE EQUIPMENT DAMAGE, PERSONAL INJURY OR EVEN DEATH.
	DANGER! DO NOT OPERATE WITHOUT PROPER GUARDS IN PLACE. ROTATING PARTS MAY CAUSE SERIOUS OR FATAL INJURY.
	DANGER! HIGH VOLTAGE MAY CAUSE SERIOUS OR FATAL INJURY.
	WARNING! DISCONNECT ALL POWER WHILE ADJUSTING UNITS. USE APPROPRIATE LOCK-OUT EQUIPMENT TO PREVENT ACCIDENTAL EQUIPMENT START-UP.

SAFETY FIRST !

The following safety precautions are basic requirements for attending to, operating, installing, maintaining, or cleaning equipment, and should **ALWAYS** be followed. ***NO EXCEPTIONS!***

- **ANY AND ALL PERSONNEL WHO WILL BE INSTALLING, OPERATING OR MAINTAINING THIS EQUIPMENT SHOULD READ THRU THE ENTIRE MANUAL BEFORE WORKING ON OR NEAR THE EQUIPMENT.**
- **ONLY QUALIFIED, TRAINED PERSONNEL SHOULD INSTALL, OPERATE AND MAINTAIN THE EQUIPMENT.**
- **FAILURE TO READ AND UNDERSTAND ALL SAFETY PRECAUTIONS MAY CAUSE INJURY OR DEATH!**
- THIS PREFACE IS INTENDED TO ALERT ALL INSTALLERS, OPERATORS, USERS AND PERSONNEL OF THE POTENTIAL SAFETY HAZARDS. **OTHER SAFETY WARNINGS AND DANGERS ARE LISTED FURTHER THROUGHOUT THIS MANUAL. READ THE ENTIRE MANUAL!**
- **ALL ELECTRICAL INSTALLATION, MAINTENANCE AND REPAIR SHOULD BE PERFORMED ONLY BY A QUALIFIED, CERTIFIED ELECTRICIAN.**
- **REMEMBER, NO MANUAL CAN PREVENT SLOPPY OR IRRESPONSIBLE BEHAVIOR WHEN INSTALLING, OPERATING OR MAINTAINING THIS EQUIPMENT. SAFETY IS UP TO YOU!**
- **ALWAYS ALWAYS ALWAYS DISCONNECT AND LOCK-OUT ELECTRICAL POWER** from the service to the control panel before performing any maintenance, repair or service functions OF ANY KIND. Always!
- **NEVER NEVER NEVER OPERATE EQUIPMENT WITHOUT ALL GUARDS IN PLACE.** They were installed for a reason.
- **Observe good safety habits at all times.** Use care to avoid personal injury or damage to equipment.
- **Keep clothing and hands away from rotating or moving parts even when equipment is NOT running, in the event of an unexpected or automatic start-up.**
- Always use safety glasses to protect your eyes.
- Always use hearing protection. Avoid extended exposure to equipment with high noise levels.

SAFETY FIRST !

- Use proper electrical installation wiring and controls consistent with local and national electric codes, using a qualified electrician.
- Refer to motor name plates and control panel documents for proper power supply requirements. Be sure connections are tight and adequately secured to prevent shorts and to assure maximum protection against moisture and corrosion.
- Be sure equipment is electrically grounded in accordance with code requirements.
- Avoid contact with energized circuits or rotating parts.
- Act with care in accordance with prescribed procedures in handling and lifting the equipment.
- Be sure mounting and assembly bolts are secure.
- Be sure equipment is properly enclosed or guarded to prevent access by children or other unauthorized personnel, to prevent possible accidents.
- Be sure shaft keys on gearmotors are fully captive before unit is energized.
- Provide proper safeguards for personnel against rotating parts.
- Be familiar with the equipment and read all instructions thoroughly before installing, operating or working on it.



THE EQUIPMENT SHOULD NOT BE ENTERED BY PERSONNEL.

Concrete Reclaimer Systems:

A Concrete Reclaimer System includes the Concrete Reclaimer AND the Slurry Collection System, i.e. Settling Ponds. Both need to be properly maintained for proper function of the SYSTEM. If the concrete reclaimer SYSTEM is properly maintained, build-up inside the machine housing should be minimal, and not cause equipment problems. **If substantial build-up occurs, the SYSTEM is not being properly maintained.**

FIRST LOCK-OUT/TAG-OUT THE EQUIPMENT, THEN DISCONNECT AND REMOVE THE SUB-ASSEMBLIES (i.e. Rotary Screen and Sand Auger) FROM THE MACHINE HOUSING FOR CLEANING.

MORE FREQUENT POND CLEAN-OUTS SHOULD BE SCHEDULED, AND PROPER HOUSE-KEEPING SHOULD BE COMPLETED, TO MINIMIZE INTERNAL CEMENTITIOUS BUILD-UP.

SAFETY FIRST !

Systems that use compressed air:

- **HIGH PRESSURE AIR SHOULD BE PROPERLY BLED FROM SYSTEM PRIOR TO MAINTENANCE OR ADJUSTMENT.**
- Always wear safety glasses and other personal protection devices when installing, operating, adjusting or maintaining this equipment.



WARNING!

COMPRESSED AIR. LOCK OUT source and BLEED OFF pressure before servicing equipment.

Systems that use Flocculants:

First-aid measures for handling and using Flocculant(s)



Inhalation If exposed to excessive levels of dusts or fumes, remove to fresh air and get medical attention if cough or other symptoms develop. If not breathing, give artificial respiration or give oxygen by trained personnel. To avoid inhalation problems, it is recommended that a respirator be worn by all personnel involved in using or handling flocculant(s).

Skin contact Immediately flush skin with running water for at least 20 minutes. Get medical attention if irritation develops or persists. It is recommended that all personnel involved in using or handling flocculant(s) wear protection covering exposed skin, including long sleeve shirts, long pants, gloves, etc.

Eye contact Immediately flush eyes with plenty of water for at least 20 minutes. Get medical attention if irritation develops or persists. It is recommended that all personnel involved in using or handling flocculant(s) wear protective eye-wear and face shield.

Ingestion Have victim rinse mouth thoroughly with water. If ingestion of a large amount does occur, seek medical attention.

Consult Flocculant Manufacturers current Safety Data Sheet for further information.

SECTION 1.0 MECHANICAL INSTALLATION

1.01 EQUIPMENT DESCRIPTION

Thank you for choosing the Model AFD Automatic Flocculant Dispenser. By reading and understanding these written instructions, and following all operational, safety and maintenance procedures, the AFD will give you many years of service with minimal maintenance.

IMPORTANT NOTE:

ALL dimensions, weights and technical specifications are subject to change, at BFK's discretion, from previously published information. In some applications, NON-standard or custom pieces may be supplied, which may or may not be covered in this manual.

The manual attempts to show common, typical installations. YOUR ACTUAL INSTALLATION MAY VARY.

This manual is intended as a guideline only, and may or may not represent the actual equipment supplied. Some pictures and/or drawings may show earlier or different revisions of the same machine or similar design, and may not totally represent the revision or design of the machine you have.

IN ALL CASES, IT IS THE RESPONSIBILITY OF THE CUSTOMER TO ENSURE PROPER SIZES AND DESIGNS OF ALL CONNECTIONS, FITTINGS, HARDWARE, WIRING, ETC. ARE PROVIDED BEFORE INSTALLING AND OPERATING EQUIPMENT, AND

IT IS THE CUSTOMER'S RESPONSIBILITY TO INSTALL AND OPERATE IN A MANNER CONSISTENT WITH ALL FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS IN THEIR LOCATION, INCLUDING BUT NOT LIMITED TO ELECTRICAL, SEISMIC, AND CLEAN WATER CODES AND REGULATIONS.

BFK SHALL BE HELD HARMLESS FROM PROBLEMS OCCURRING FROM IMPROPER INSTALLATION AND OPERATION OF THE SYSTEM.

Please consult factory if any discrepancies arise BEFORE the system is installed and operated.

Metric equivalents are provided for reference only.

1.02 OFF-LOADING

TOTAL WEIGHT OF THE SYSTEM IS APPROX. 600# [272kg], depending on installed options.

1.03 PREPARATION

Hardware and miscellaneous which may be required for *each* AFD to be installed. Individual installations vary, so confirm required items before purchasing and installing. When in doubt, CONSULT FACTORY.

→ Pump Inlet Hose Ref. Section 1.04.01

(1) 1-1/2" diameter [38mm] rubber suction hose, length as needed, and hose clamps.

→ Pump Discharge Hose Ref. Section 1.04.02

(1) 1-1/2" diameter [38mm] rubber suction hose, length as needed, and hose clamps.

→ Flocculant Discharge Connection Ref. Section 1.04.03

Hose clamp(s)

→ Compressed Air

If Optional Air Compressor was not purchased, you will need to install the proper air fitting to the inlet air piping under the flocculant tank.

→ Electrical Connections

Electrical connections and mounting should be performed by qualified electrician, following all local and national codes. Electrician to determine use of junction boxes, water-tight fittings, etc. to meet codes.

→ Foundation mounting hardware

Four (4) 3/8" dia. Anchor bolts and associated hardware.

OPTIONAL EQUIPMENT:

→ Air Compressor

→ Heat Base

→ Submersible Mix Pump

INSTALLATION AND FIELD ASSEMBLY

The AFD is shipped assembled as far as possible at the factory, including any pre-selected options, if ordered.

The AFD is designed to be mounted at or near the edge of the pond or pit that the flocculant will be dispersed into. It will pull water from the pond/pit, and deliver water back to the same pond/pit to effectively mix the water with the flocculant.

Flocculant is introduced via a separate hose, which uses pressurized air to blow the flocculant thru the hose and out into the pond/pit onto the surface of the water.

! DANGER !

Because the AFD is powered electrically, coupled with its close proximity to a body of water, THE AFD MUST BE SECURED TO THE FOUNDATION IN ORDER TO PREVENT IT FROM BEING DROPPED OR KNOCKED INTO THE WATER WHILE HIGH VOLTAGE IS APPLIED.

IN ADDITION, IT MUST BE GROUNDED IN ACCORDANCE WITH ALL NEC AND LOCAL CODES!

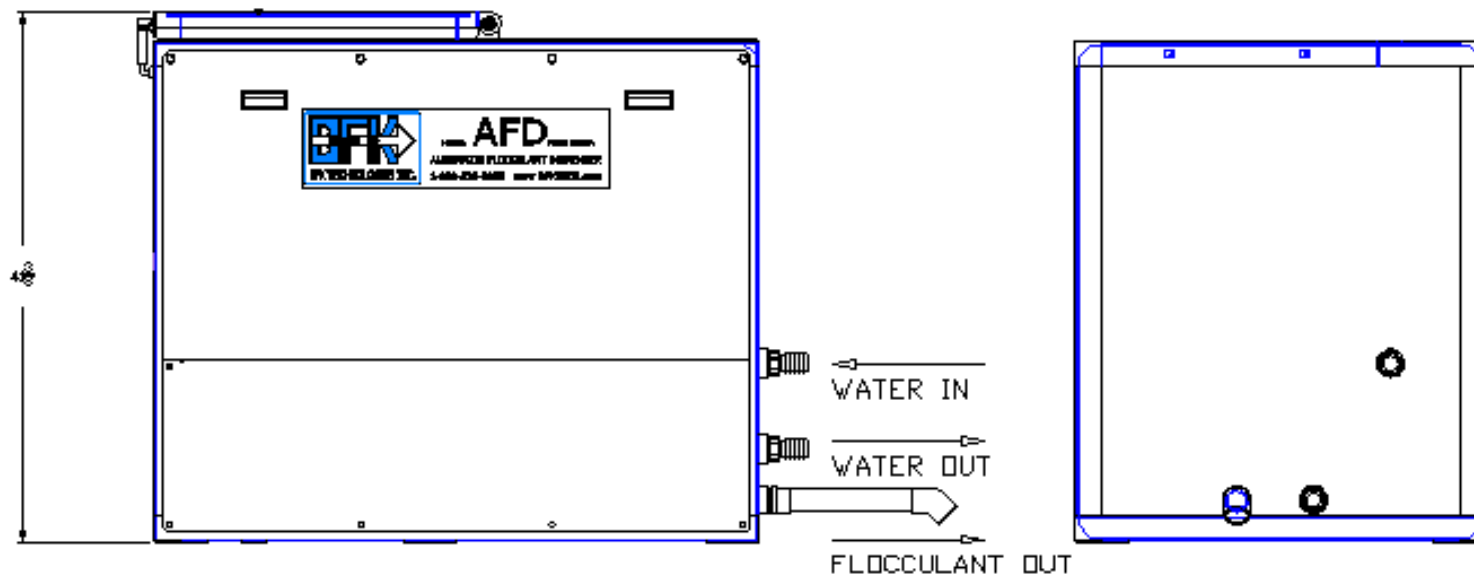
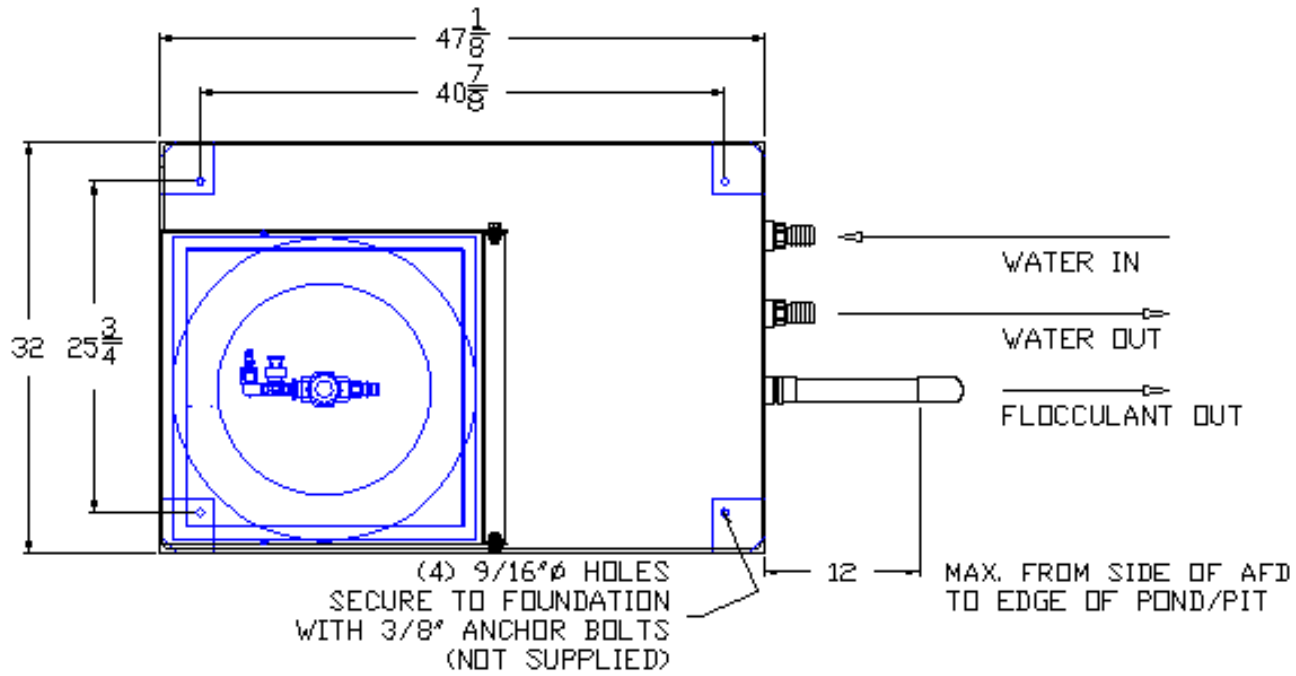
! DANGER !

**FAILURE TO PROVIDE PROPER GROUNDING, AND SECURE MOUNTING
MAY RESULT IN SEVERE INJURY OR DEATH!**



The system is designed to continuously circulate the water in the pond. The mixing action provided will help to stir the flocculant and mix it in with the particles you are attempting to settle out.

Customer should secure the AFD to the foundation within 12" of the pond or pit wall, as shown in the drawing below. We recommend (4) 3/8" dia. Anchor bolts and associated hardware (by others).



1.04.01 PUMP INLET CONNECTION (WATER IN)

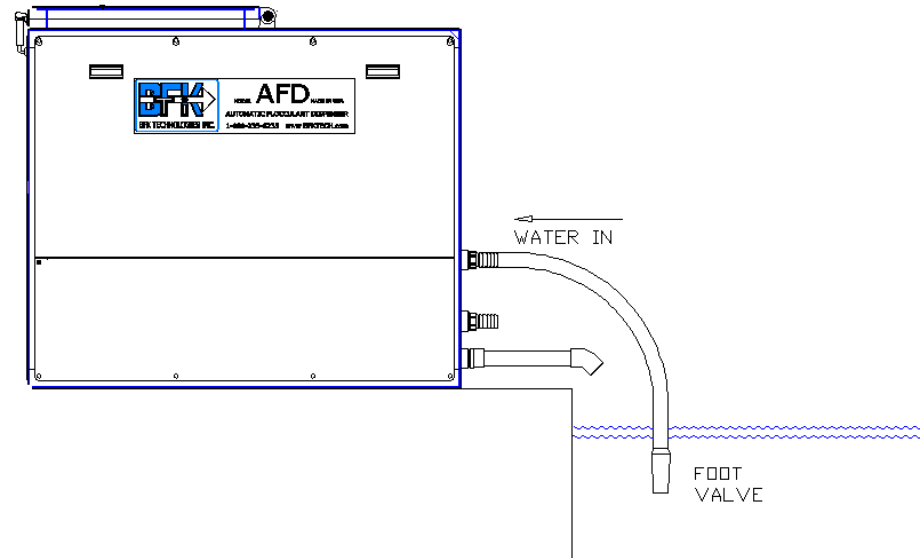
The WATER IN connection is provided via a 1-1/2" FNPT coupling welded into the sidewall of the AFD. A 1-1/2" male threaded king nipple is supplied loose with the AFD for customer use (must be installed in the field). Customer may supply alternate style(s) of hose connections of their own choice and supply.

Additionally, a foot valve is also supplied loose (requiring field installation by customer), which should be placed on the pond (suction) end of the hose.

Hose and hose clamps are supplied by the customer or others. Hose should be 1-1/2" dia., suitable for pump suction. Additional fitting(s) may also be required to complete the WATER IN hose connection, as determined by the customer or the installer.

The fitting and hose should be connected to the coupling marked WATER IN on the drawing.

The suction line should be long enough to ensure placement of the foot valve below the surface of the water. It should not be so long that the foot valve is laying at or near the bottom of the pond or pit, where solids will begin to settle out. If the foot valve is placed too close to the bottom of the pond, it may become plugged with solids. Failure to keep the inlet hose free of blockage will ultimately lead to premature failure of the pump, and plugging of the plumbing.



1.04.02 PUMP DISCHARGE CONNECTION (WATER OUT)

The WATER OUT connection is provided via a 1-1/2" FNPT coupling welded into the sidewall of the AFD. A 1-1/2" male threaded king nipple is supplied loose with the AFD for customer use (must be installed in the field). Customer may supply alternate style(s) of hose connections of their own choice and supply.

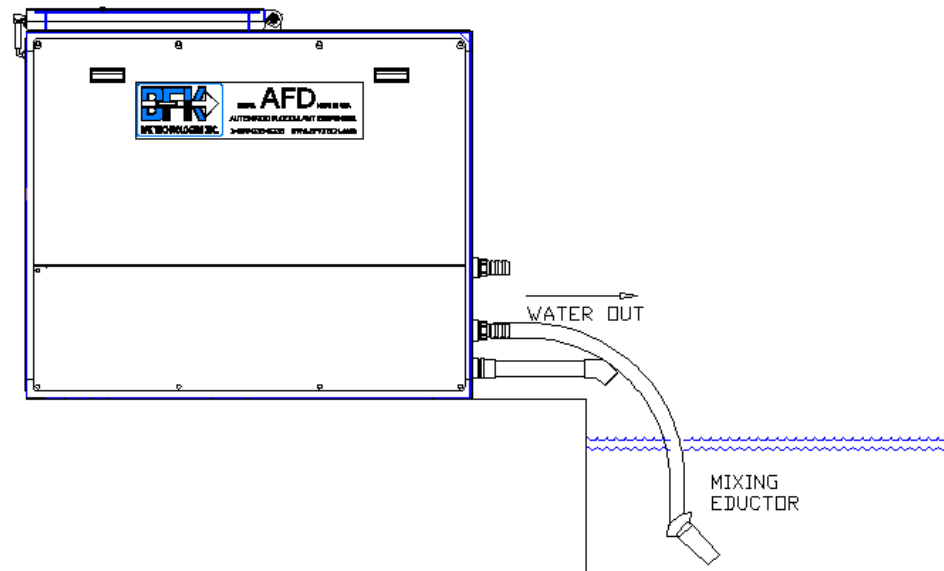
Additionally, one (1) Mixing Eductor is also supplied loose (requiring field installation by customer), which should be placed on the pond (discharge) end of the hose.

Hose and hose clamps are supplied by the customer or others. Hose should be 1-1/2" dia., suitable for pump suction. Additional fitting(s) may also be required to complete the WATER OUT hose connection, as determined by the customer or the installer.

The fitting and hose should be connected to the coupling marked WATER OUT on the drawing.

The discharge line should be long enough to ensure placement of the Mixing Eductor near the bottom of the pond or pit. It should be positioned so that the high pressure flow of the water actually discharges at about a 45 degree angle onto the floor of the pit/pond, moving the solids particles attempting to settle out, and scouring the floor of the pond or pit to keep the flocculant suspended in the pond water.

For every gallon of water pumped thru the mixing eductor, an additional 4 to 5 gallons is pulled thru at the same time, creating a very effective mixing cyclone at the nozzle.



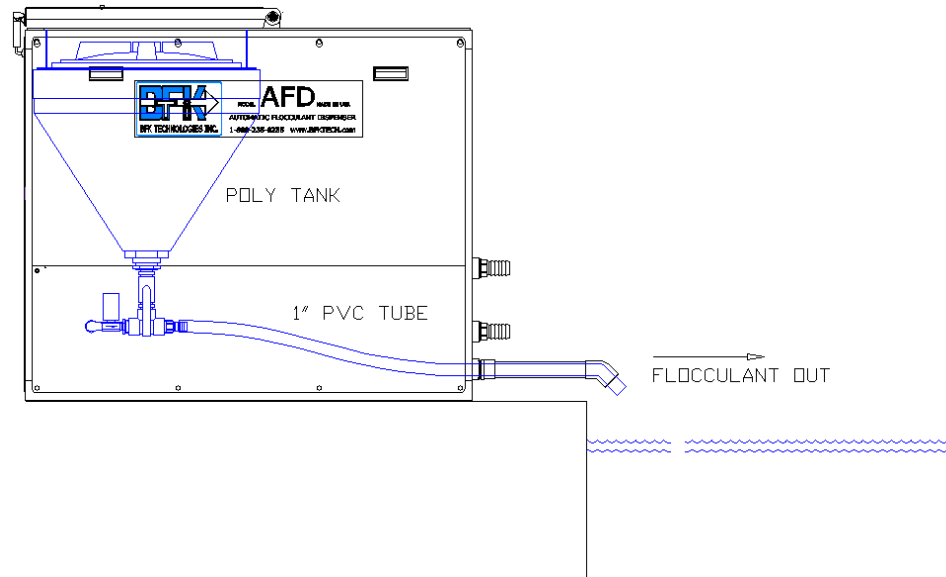
1.04.03 FLOCCULANT DISCHARGE CONNECTION (FLOCCULANT OUT)

The FLOCCULANT OUT connection is provided via a 1-1/2" FNPT coupling welded into the sidewall of the AFD. A PVC pipe assembly is supplied loose, which has a 1-1/2" male thread adapter end, a 12" long piece of pipe, and a 45 degree elbow end.

A 1" dia. PVC tube is also supplied loose.

Install the PVC pipe assembly in the fitting marked FLOCCULANT OUT in the drawing, so that the 45 degree elbow ends up pointing down toward the water surface, as shown.

Slide one end of the 1" PVC tube into the pipe assembly until it comes out the 45 degree elbow. Attach the other end of the PVC tube to the 1" king nipple installed under the round poly tank, and secure with a hose clamp. Pull the PVC tube taught thru the end of the 45 degree elbow to eliminate any dead spots in the tube where flocculant could collect.



1.04 INSTALLATION AND FIELD ASSEMBLY, OPTIONAL EQUIPMENT

1.05.01 OPTIONAL AIR COMPRESSOR

In plants or locations where piped air is not available or not cost-effective, an optional pancake-type air compressor can be installed.

If you purchased the optional air compressor, it will be mounted, pre-wired and pre-plumbed into the AFD cabinet. The compressor will turn on and off with the main System Off/On switch – when System is turned ON, the compressor will provide the required air pressure to operate the system.

Consult the manual from the compressor manufacturer for maintenance, operational and safety requirements.

1.05.02 OPTIONAL HEAT BASE

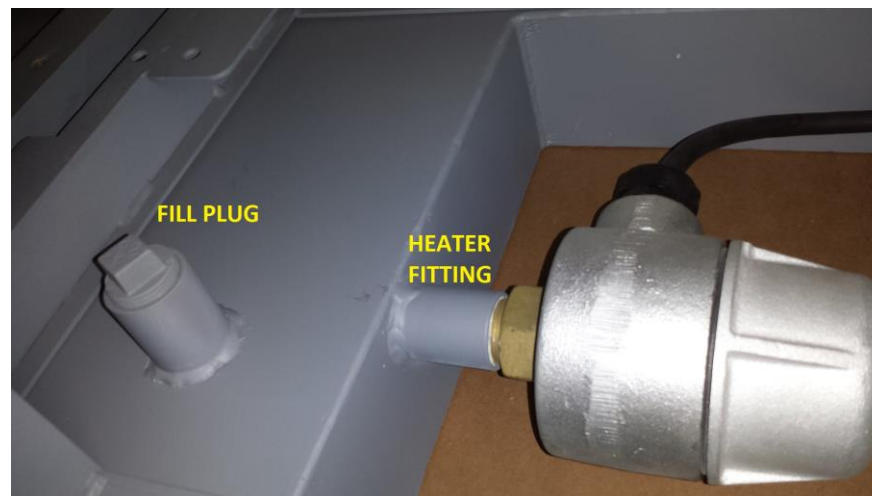
In locations where below freezing temperatures are anticipated, it is recommended that the optional heat base be purchased.

The heat base comes installed, mounted and wired to the main AFD cabinet. Simply set in place and secure to the foundation, as described above in Section 1.04, using the 3/8" dia. Anchor bolts and associated hardware discussed therein, using the same footprint pattern shown.

Once the heat base and AFD cabinets are mounted and secured, you must add anti-freeze to the heat base tank. The heat element will be heating the anti-freeze.

Remove the Fill Plug and add approx. 14 gallons of anti-freeze, making sure the heat element is completely submerged.

OPERATING THE HEAT ELEMENT WITHOUT ANTI-FREEZE MAY CAUSE DAMAGE TO THE HEAT ELEMENT!



SECTION 2.0 ELECTRICAL CONTROL PANEL

2.01 SCHEMATICS/FIELD WIRING & POWER REQUIREMENTS

Schematic drawings are sent in inside the door of the electrical control panel enclosure. It is up to the qualified electrician on-site to run the appropriate conduit and cable for proper connection of all equipment supplied with your system.

Main power requirements are as follows: 220VAC Single Phase 60 Hz Main Breaker: 30 Amp

2.02 PANEL OPERATIONS

The main disconnect on the door of the panel provides power to the panel.

Turn the SYSTEM ON/OFF selector switch to the ON position.

- The pump will begin to circulate water from the pond, and back out (See Section 3 below for initial start-up and pump priming).
- The Air Valve will cycle open and closed (depends on timer settings).
- If the optional Air Compressor was purchased, it will begin to pressurize/cycle.



The system is designed to be turned ON when in use (pump runs, air valve cycles, air compressor cycles, etc.) and to run continuously during normal operation.

If the optional Heat Base is installed, you must turn the HEATER ON/OFF switch to the ON position in order to provide power to the heater element.

The heater element will continuously heat the heat base/anti-freeze as long as the HEATER ON/OFF switch remains in the ON position, regardless of the SYSTEM ON/OFF switch position.

This set-up allows the user to turn the SYSTEM (i.e. pump, air valve, etc.) on each morning and off each evening, while allowing the heater to keep the system warm, even after the system has been shut down for the day.

SECTION 3.0 INITIAL EQUIPMENT START-UP

Prior to operating the AFD, you will need to **prime the pump** by filling the casing with water.

The pump is a self-priming centrifugal, meaning it must be primed once to begin, or thereafter if prime is ever lost (leak in the plumbing, pump is drained, etc.). After the first priming, the pump should hold prime thereafter under most conditions.

Prime the pump by removing the plug on top of the pump casing, near the discharge port. Fill with clean water until full.

It is also recommended that the WATER IN hose be filled with water. The foot valve at the bottom of the hose will keep water in this line.

Priming both the pump and the INLET hose are the fastest way to get the pump to operate properly.

Before turning the main system ON, you should have already connected your air supply to the fitting under the flocculant tank (unless you purchased the optional air compressor). You should also set the 2 rotary switches located on the air valve under the Poly Tank all the way counter-clockwise (minimum).

Turn the Main Disconnect switch on the face of the panel to the ON position. Turn the System On/Off selector switch to ON. An adjustable timed pull-up relay is included in the system, and is typically set at the factory for about 3 seconds.

Approx. 3 seconds after the selector switch is turned ON, power will be delivered to the Pump, the Air Compressor (if supplied), and the air valve.

The pump may take a few seconds to begin pumping while it works out any air in the lines or casing. If the pump has not picked up prime after 2 minutes, turn the system OFF, allow the motor to cool for 5 minutes, re-prime the pump and WATER IN line, and try again. Make sure the WATER IN line has no leaks, if there is an air leak in this line, it may prevent the pump from reaching prime. It may take more than 1 try to get a successful prime.

Consult the pump manufacturers manual for further instruction and trouble-shooting.

If equipped, check to make sure the air compressor is operating properly. Listen for the air valve to open and close automatically, based on the switch settings.

Allow system to run for 10-15 minutes to make sure there are no leaks in the plumbing. After the break-in time, turn the System On/Off switch to the OFF position.

To provide heat to the heat base, if equipped, you must turn the Heater On/Off switch to the ON position. Additionally, there is a thermostat setting inside the cap of the heat element itself. **Before removing cap and adjusting thermostat setting, the main control panel should be disconnected from the power source using standard OSHA lock-out/tag-out procedures to eliminate the possibility of personnel injury due to electrical shock.**

SECTION 4.0 AUTOMATIC FLOCCULANT DISPENSING

You are now ready to begin addition of flocculant into your pond or pit.

Fill the poly tank with up to 100# (two fifty pound bags) of supplied flocculant. Your AFD system is now ready.

Before turning on the Flocculant Dispenser, you should first “seed” the pond you will be dosing with flocculants. The preferred method, to ensure good mixing of the solids with the flocculant, is described here:

Spread 50# of flocculant (one bag) along the front edge/lip of a front-end loader bucket. Have the loader operator drive into the pond, all the while bumping the lever to begin shaking off the dry powder into the water. Once the powder has been delivered, driver should continue to drive back and forth, tipping his bucket in the water, to stir the entire pond and disperse the flocculant. This should continue for 3-4 minutes to ensure good mixing, with the goal being to “seed” the pit with the flocculant.

You will notice a reaction, with clear water on the surface of the pond, and suspended solids beginning to fall out of the water.

Inspect the switch settings on the air valve under the poly tank. The automatic air valve has 2 rotary switches, marked ON SEC and OFF MIN.

Set the ON setting to approx. 2 seconds.

Set the OFF setting to approx. 5 minutes.

This will allow the valve to open for 2 seconds, the compressed air will force flocculant into the pond for that time period. The valve will then stay closed for 5 minutes, before opening again for 2 seconds, etc.

Turn the System switch to ON. Make sure the pump is running, the air valve is cycling, and compressed air is available (if you ordered the optional air compressor, you should hear the compressor kick in upon power up.)

The flocculant tends to settle to the bottom of the pond if not agitated. Therefore, 2 to 3 times per day the loader operator should drive into the pond and stir it up, as described above.

With the above timer settings, you should expect 50# of flocculant to last for approx. 2 to 4 days. This should be sufficient time to determine the effectiveness of the flocculant in your pond system.

As you begin to use the system, you may be able to increase the OFF time to 10 or more minutes, as the system settles in, and you become familiar with your usage rate. This might allow for a run time of approx. 3-5 or more days from one 50# bag. Obviously, usage amounts vary widely based on several factors.

Your goal is to dial in the flocculant feed rate to drop the solids particles out of the slurry, while using as little flocculant as possible.

SECTION 5.0 FINE TUNING

Users have reported the following conditions that will help you determine if you are using too much or not enough flocculant. It may take a week or 2 of your observations to realize what you are looking at, so be patient with the process, and you will eventually be able to dial in your usage amount.

Too Much Flocculant

- Water/slurry in the pond will appear to take on a “gloss” or “shine”.
- Particles may not tend to grow as large, as many floc particles are competing to “grab” individual cement particles – more floc means less available free solid particles to attach to.

Recommend: Lower usage rate by increasing the OFF time on the feeder valve. Make changes in steps, keep note of your changes and the results until the shine disappears and the particle sizes increase.

Not Enough Flocculant

- Water in the pond will appear “dingy” and “gritty” due to the excess particles not grabbed by the flocculant.

Recommend: Increase your usage rate by decreasing the OFF time on the feeder valve. Make changes in steps, keep note of your changes and the results until the “dirty” appearance of the water disappears.

SECTION 6.0 ROUTINE INSPECTION AND MAINTENANCE CHECKLIST

DAILY

1. EVERY DAY, prior to use, make sure all Safety Guards are in place and properly secured to the equipment.
2. EVERY DAY, prior to use, inspect ALL Safety Stickers and CLEAN or REPLACE if covered or damaged.
3. Check level of flocculant in poly tank, add as needed.
4. Check clear hose on floc discharge connection for plugging, clean as needed.

AS NEEDED, EVERY ONE TO THREE DAYS, or WEEKLY: (depending on usage)

1. Clean pit(s) with loader.
2. Check the foot valve and mixing eductor for build-up or plugging. Clean if necessary so water flows freely.

For pump, Air Compressor, and air valve maintenance, refer to manufacturers printed specifications.

SECTION 7.0 TROUBLESHOOTING

The Troubleshooting Guide will help “point you in the right direction” when trying to solve problems with your reclamation system. It does not, and cannot, cover *all* the problems you may experience in the field. However, it will give you (and a BFK Technician) a good idea of where the trouble may be.

PROBLEM: *Flocculant not being dispensed*

POSSIBLE CAUSES:

Main disconnect or System switch is turned off
No flocculant in Poly Tank
No air pressure
FLOCCULANT OUT tube plugged

POSSIBLE SOLUTIONS:

Turn ON
Add flocculant
Check air compressor, hoses, etc.
Remove tube, clean or replace

PROBLEM: *Particles not dropping out of water*

POSSIBLE CAUSES:

No flocculant in Poly Tank
Too much floc being added
Not enough floc being added

POSSIBLE SOLUTIONS:

Add flocculant
INCREASE Off time on air valve (see Sec. 5.0)
DECREASE Off time on air valve (see Sec. 5.0)

PROBLEM: *System is not staying warm in cold weather/Pump or Plumbing is frozen*

POSSIBLE CAUSES:

Heater Switch is Off
Thermostat is off, or too low
Anti-freeze not in tank, or not enough used

POSSIBLE SOLUTIONS:

Turn ON
Disconnect Power (LOTO), remove heater cap, adjust thermostat
Make sure anti-freeze was added to heat base tank, and enough was used to completely submerge the element probe.

SECTION 8.0 SPARE PARTS LIST

	<u>BFK Part No.</u>
1. Main Pump	WPM-CEN-24FP-120
2. Air Compressor	A-CMP-06G-150
3. Air Valve	VLV-E-DRN-08
4. Flocculant	C-FL-LPH3-50

SECTION 9.0 OPERATING BELOW FREEZING and WINTERIZING

If the AFD needs to be operated in winter conditions (below freezing), an optional Heater Base is available. Consult Factory for pricing and availability.

Alternatively, house the AFD in a heated environment. Make sure the WATER IN and WATER OUT lines are disconnected when not in use, and make sure they do not freeze during operation, as failure to allow water in or out will damage pump.

If you shut the system down for winter, winterize for storage as follows:

- Drain the pump and all plumbing prior to storage.
- Disconnect and drain the inlet and discharge hoses, foot valve and eductor(s).
- Drain air compressor tank and disconnect all hose and fitting assemblies to make sure they dry properly.
- Empty the flocculant tank of any remaining flocculant.
- Store the entire system indoors, in a heated environment, if possible.

Inspect and clean Pump so it is ready for future use.

Prior to spring start-up, reconnect all hoses, and reinstall and connect pump, etc., as defined in preceding sections. During re-connection, visually inspect all hoses, connections and nozzles for leaks, cracks, plugging/clogging, etc. Clean as needed. Correct or replace as necessary.

Start-up AFD system as defined in Section 3.0 INITIAL EQUIPMENT START-UP.

LIMITED WARRANTY

BFK Technologies, Inc. (BFK) warrants to the original purchaser the BFK equipment that is not manufactured by others, to be free from defects in material and workmanship under normal use and service, and when properly maintained by the purchaser. Use or service with corrosive or abrasive chemicals or materials or in a corrosive or abrasive atmosphere shall not be deemed normal. BFK's obligation under this warranty is limited to repairing at BFK's factory or a factory authorized service center or furnishing a replacement for any part, or correcting any workmanship, which shall be demonstrated to BFK's satisfaction to have been defective at the time of delivery and with respect to which a written claim specifying the particular defect or defects shall have been delivered to BFK or a factory authorized service center within one (1) year from the date of start up of the equipment, not to exceed eighteen (18) months from the date of the delivery of the equipment to purchaser. If the equipment is delivered piecemeal, the warranty period for each portion shall commence at its date of delivery.

The removal by purchaser of parts returned to BFK or a factory authorized service center for repair or replacement and the installation by the purchaser of replacement or repaired parts shall be at purchaser's expense. No work will be done by BFK or factory authorized service center at the site of the installation unless in BFK's opinion it is impractical for purchaser to remove the defective part and return it to BFK's factory or a factory authorized service center.

Defective parts shall be returned, after pre-authorization by BFK, to BFK's factory or to a factory authorized service center. Repairs, replacements, or adjustments for which BFK is responsible will be made as promptly as possible within the standard working hours of any day. All costs for freight, duties or any other related costs for sending or receiving parts are the responsibility of the purchaser. Overtime, if required by purchaser, will be paid for by purchaser. BFK does not warrant equipment manufactured by others, but will submit the manufacturer's warranty to the purchaser upon request.

EXCEPT AS EXPRESSLY STATED HEREIN, THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, BY OPERATION OF LAW OR OTHERWISE OF THE EQUIPMENT OR SERVICES FURNISHED BY BFK OR A FACTORY AUTHORIZED SERVICE CENTER. BFK SPECIFICALLY DISCLAIMS AND EXCLUDES ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ARISING FROM A COURSE OF DEALING OR USAGE OF TRADE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. BFK SHALL NOT BE LIABLE FOR, NOR DOES BFK AUTHORIZE ANY PERSON TO ASSUME FOR BFK, ANY OTHER LIABILITY IN CONNECTION WITH THE EQUIPMENT OR SERVICES FURNISHED BY BFK, INCLUDING WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, LIABILITY FOR LOSS OF PRODUCTION, PRODUCT, EQUIPMENT OR PROFITS OR LIABILITY FOR DIRECT, INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES TO PERSONS OR PROPERTY. BFK will make no allowances for repairs, alterations or other work done unless specifically agreed to in writing. Purchaser agrees that purchaser's sole remedy for liability of any kind, including negligence with respect to the equipment and services furnished by BFK shall be limited to the remedies provided herein.

ALL dimensions, weights and technical specifications are subject to change, at BFK's discretion, from previously published information. In some applications, NON-standard or custom pieces may be supplied.

All installation, operation and maintenance instructions, including those shown in the Manual supplied with the equipment, attempt to show common, typical installations. YOUR actual Installation may vary.

The information is intended as a guideline only, and may or may not represent the actual equipment supplied. Some pictures and/or drawings may show earlier revisions of the same machine, and may not totally represent the revision of the machine you have.

IN ALL CASES, IT IS THE REPOSIBILTY OF THE CUSTOMER TO ENSURE PROPER SIZES AND DESIGNS OF ALL CONNECTIONS, FITTINGS, WIRING, ETC. ARE PROVIDED BEFORE INSTALLING AND OPERATING EQUIPMENT, and BFK shall be held harmless from problems occurring from improper installation and operation of the system.

Please consult factory if any discrepancies arise before the system is installed and operated. Metric equivalents are provided for reference only.

Your system was supplied with one or more pumps. The pump(s) has been sized to operate with most installations. However, as BFK has no control over the installation of the equipment, including but not limited to, the distance from the pump to the system, the connection method used (Hose vs. different types of pipe, for instance), fittings used, etc., it remains the end-users responsibility to ensure proper water flow and pressure is delivered to the system.

If the pump shipped with the system does not provide enough flow and/or pressure, the end-user is responsible for purchasing and installing a pump of the proper size, or adding an additional pump(s), as needed to ensure proper operation.

Failure to provide adequate water flow and pressure resulting in damaged, plugged or otherwise compromised equipment is not covered under warranty, and all costs associated will be the end-users responsibility.

