TruFlux UF Machine Operator Checklists:

ED Paint System
TruFlux UF Machine

TruFlux UF Machine Operator Checklists:

General Information

These are general instructions that can be applied to any TruFlux UF Machine. In some cases your UF Machine may not have all the options and some steps refer to a valve ID that will not be included with your machine. If this is the case please move to the next step. See TruFlux Ultrafiltration Machine Piping Schematic at the end of this document for Valve Locations. For extra copies ask for UFS Part Number 997303.

Use of Asterisk

Since your UF Machine has more than 1 UF Module, some of the Valve ID numbers have the same prefix followed by a dash and the Module Letter symbol. In order the simplify Operator Checklist, in some cases valve ID will be called out as with the prefix followed by the 'A'. When you see the asterisk you need to replace it with the letter of the UF Module you are working on. For example if you are working on Module B and the Checklist says to Close 'V3-A', you should read this as 'V3-B'.

Notes

1. After several days of rest the permeate or RO water can support the growth of fungus or bacteria. If a long shutdown is considered then contact UFS for recommendations for a preservative that can used instead of the permeate or RO (or DI water).
2. Do not use silicone or purchase components that may use silicone as a lubricant. If you have to replace a component such as a valve you must specific to your vendor that it not be lubricated with silicone.

Materials/Special Tools to keep on near UF Machine (or in maintenance crib)

30 day supply of glazed 25 micron filter bags (UFS PN 205xxx) for all Bag Filter vessel housing(s).
Spare CIP pump mechanical seal and O-ring (UFS PN 164016)
250 ml or glycerin
2 x strap wrenches
UF Element seal insertion tool (looks like a shoe horn) (UFS PN Z005068)
Flashlight or other emergency lighting when power out strikes and an operator has to climb steps to get to the UF Machine.

UF Cleaning Solutions

The basic UF Cleaning Solution is described in the TruFlux UF Getting Started Guide. If there is sufficient belief that a particular foulant is adversely affecting the production of permeate, such as iron, lead, pretreatment, etc - then a more specific UF Cleaner can be employed. Use only those cleaners and materials that are approved for use by your ED paint vendor and will not contaminate the ED paint bath.

Female type UF Element

Your UF Machine was set up to use a female type standard (7.6" nominal OD) UF Element that has a bored opening in a PVC 1-1/4" pipe on either end of the UF Element. Either end may be pointing up, however the Seal on the OD of the UF Element must be on the top side (see page 11 Step 9). It is possible for you to use the male type UF Element (i.e. the removable end plugs and permeate adapters are built into the UF Element for the Male type UF Element) and in the case the End Plug (UFS PN 090091) and Permeate Top Cap Adapter (UFS PN 090085) are not required. Do not throw the End Plug or permeate Top Cap Adapter away as you may have to use them again in the future.

Groove Clamps

These do not have torque limits. The hardware must be tightened alternately to seat the gasket. Tighten the hardware until the halves of the clamp touch and the hardware is tight. Do not use a groove gasket that is cut, torn, or has other damage.

TruFlux UF Machine Operator Checklists:

Daily Operation

Record Keeping

Record the permeate rates, ED paint outlet pressure for each UF Module (i.e. A, B, C, D, etc), total ED paint flow rate, ED bath temperature, etc as required in the UF Log book. Each time work or action is taken on the UF Machine a record of that activity needs to be entered into the UF logbook.

Weekly Operation

Flush the appropriate UF Module with Permeate

Each UF Module should be flushed with permeate once a month. Set up a schedule where for example UF Module A is flushed on the first Thursday of the month; UF Module B is permeate flushed on the second Thursday of the month and so on.

Normal Start-Up

Situation: UF Machine is offline and UF Elements are resting in permeate, or buffered (to same pH as the ED paint bath) RO (or DI) water. If this is a New Paint System the paint must be circulated thru the Bag Filters for 24 to 48 hours BEFORE bringing the UF Elements online.

When turning on the TigerMag flow meter the reading must read zero. If it does not, please see re-zeroing instructions that came with your TigerMag.

Goal: Restart the production of permeate after a period of rest or if the UF Feed pump was shut down for maintenance.

Persons required: 1 Tools/Materials Required: None

Important ED Machine Valve Positions
V9 valve is Closed.
V10 valve is Closed
UF Feed pump is On, VP2 valve is Open, VP3 is Open, and VP1 valve is Open.
VT1 valve is Closed, and VT2 valve is Open.

Primary Checks
Do Bag filters need to be changed?
Make sure the UF Elements are flushed (twice if new and shipped in preservative) and resting in permeate or buffered RO water.

Follow Checklist
Step 1. Open V1-* valves, Open V11 valve, and Close V2-* valves
Step 2. Close all V6-* valves and Close all V4-* valves
Step 3. Open all V3-* valves and Open all V5-* valves. Open all V25-* valves and Open all V26-* valves.
Step 4. Crack Open one notch, or less, BPV valve, Crack Open V18 Valve
Step 5. Open V9 valve
Step 6. Close VP2 valve and immediately go to Step 7.
Step 7. Slowly begin to Open the valve V10 taking a *Full 60 seconds*. Stop opening the valve once the TigerMag paint flow meter reads the **required ED paint flow rate** (i.e. # UF Modules x 70 gpm + ~5%).
Step 8. Close V18 when all the air has been purged and ED paint begins to enter into the bucket.
Step 9. Observe the permeate flow through the F-* flow meters, make sure they are clear and normal looking. It is common to see some ED paint in the permeate for up to 10 minutes or so with new UF Elements.
Step 10. Slowly throttle Closed V9 valve until P2 reads 10 – 15 psi (if this flow is meant to exit through eductors, then this may have to be adjusted as required per the ED paint vendor). Now slowly Open V10 and/or VP1 and VP3 valve until the ED paint flow as shown on the TigerMag flow meter is as required. Check P2 to insure you still have 10 – 15 psi, if not, slightly close V9 valve more and then Open V10, VP1 & VP3 valve a little more. Repeat as required until P2 reads between 10 – 15 psi and the TigerMag reads as required.
Step 11. UF Machine is now in 'Normal working mode' and you are finished.
Step 12. Complete recording information into the UF Logbook.

Normal Operating Parameters
ED paint flow is (# UF Modules x 70 gpm) x ~1.05.
P2 pressure gage reading is 10 to 15 psi minimum
Typical pressure drop across P1 to P2 is 20-25 PSI minimum.
Standard permeate rate per UF Module is 2.5 gpm +/- 10%

Normal Shut-down

Situation: ED machine will be shut down or there is planned maintenance on the UF feed pump, or some other activity that requires the UF Machine to be placed off line.

Goal: Place the UF machine in an offline status in a controlled manner to eliminate the possibility of damage (i.e. lowered permeate production rate) to the UF Elements.

Persons required: 1 Tools/Materials Required: flashlight, 1 x clean glazed filter bag

Important ED Machine Valve Positions
Valves are in Normal Startup position

Follow Checklist
Step 1. Follow the 'Monthly Permeate Flushing of a UF Module' for Module A, but do not bring Module A back on line (do not increase the flow of ED paint back to the normal level as it will be reduced to nothing as all of the UF Modules are flushed).
Step 2. Follow the 'Monthly Permeate Flushing of a UF Module' for Module B, but do not bring Module A back on line.
Step 3. Continue flushing each of your UF Modules Follow the 'Monthly Permeate Flushing of a UF Module' for Module A, but do not bring Module A back on line.
Step 4. Next follow the checklist to 'Changing Bag Filters'.
Step 5. UF Machine is now ready for a short rest.

Note. If the UF machine will be off line for more than 7 days, then biologicals may begin to grow in significant quantities. Contact UFS Corporation and your ED paint supplier for advice as some sort of anti fungal/bacteria treatment may be required to be added into the flushing water to act as a preservative.

Abnormal Shut-down

Situation: Utility or building power has been lost and not expected back for at least 15 minutes. ED paint has been allowed to come to rest inside the UF Elements.

Goal: Reduce damage (i.e. lowered permeate production rate) caused lack of ED paint flow because UF Feed pump stopped working. Immediately drain paint from the UF machine, then perform a double flush of each UF Element as soon as power is restored.

Persons required: 1 Tools/Materials Required: flashlight, 1 x clean glazed filter bag

Important ED Machine Valve Positions
Valves are in Normal Startup position, except there is no ED paint flow

Follow Checklist when power has been off for 15 minutes.
Step 1. Close V10 valve first and then Close V9 valve.
Step 2. Open V31 valve, open drain plugs on each manifold, Open all V26-A valves and V28-A valves. Open all V3-A valves and Open V18 valve (to avoid vapor lock) to return ED paint to ED bath.
Step 3. Wait until the ED paint has drained. Open CIP filter vessel and confirm it is clean inside, then install a new glazed bag filter and tighten. Fill CIP tank with buffered DI Water.
Step 4. When power is turned back on proceed with Step 5. Amber colored light on CIP panel will come on when power has been restored and the CIP pump can be operated once again.
Step 5. Close all V3-A valves and Close all V5-A valves.
Step 6. Open V2-A valve and V13 Valve and V21 Valve and Crack open V20 Valve. Close V1-A valve.
Step 7. Open V4-A valve and V6-A valve.
Step 8. Open V8 valve, Close V15, and Close V7 valve, then start up CIP pump.
Step 9. Take 10 seconds to Open V7 and begin flushing of UF Module A. Throttle open VC1 Valve.
Step 10. Flush for 5 minutes or so. Make sure to keep the CIP tank at least half full and do not starve the CIP pump.
Step 11 Stop the CIP pump, Open V15 valve to drain the CIP tank. Close V15 valve and Open VC1 to refill with permeate or DI water (buffer as required), Close V7 valve. Close V4-A valve and V6-A Valve.
Step 12. Remove filter bags from CIP filter vessel, wipe out inside to clean vessel to keep vessel inside's clean. It may be necessary to back flush these vessels or else use clean air to blow out the paint solids. Contact UFS for more information.
Step 13. Repeat Steps 6 through 12 for UF Module B and each successive UF Module as required.
Step 14. All UF Modules have now been flushed out and are resting in buffered DI water waiting for a UF machine restart. You are now finished until the UF machine can be restarted.
Step 15. You should next clean out the filter bag vessels as required. See checklist entitled 'Changing Bag Filters'.
Step 16. Complete recording information into the UF Logbook.

*Air Blow Down of ED Paint Inside Bag Filter Vessel -**

Situation: UF Machine is at same grade as Ecoat Tank so paint is not able to drain using gravity back to the Ecoat tank. Bag Filter vessels are full of ED paint and it needs to be removed before new filter bags can be installed, clean rags and ED paint vendor paint dilute cleaner solution.

Goal: Replace each Bag Filter one at a time.

Persons required: 1 shop air with ¼" quick disconnect coupling

Tools/Materials Required: 1 x clean glazed filter bag/vessel, clean Diluted Ecoat Paint Cleaning Solution and clean rags.

Important ED Machine Valve Positions
UF Machine is ONLINE.

Follow Checklist.
Step 1. Close V10 slowly to reduce total paint flow by 70 gpm. Close all V26-* valves, and Close all V25-* valves.
Step 2. Open V27-* valve. Connect clean air line to ¼" quick connect on top side of V28-*.
Step 3. Slowly open V28-* so clean air is allowed to enter the vessel and push paint out through V27-* valve. Open V28-* slightly more and continue for another 2 minutes or so (experience will tell if this time is enough to push put all the ED paint).
Step 4. Close V28-* valve and remove the air line and set aside.
Step 5. Close V27-* valve.
Step 6. Open the vessel and remove the old filter bag.
Step 7. Use cleaner and a new rag to wipe out the ID of the filter vessel taking care to clean the region where the ring of the filter bag has to seal up against the ID of the vessel. Place new glazed bag and make sure seal is properly set.
Step 8. Wipe the O-ring of the vessel to remove any dirt bits and replace the top cap of the vessel.
Step 9. Tighten the top cap of the filter bag vessel in an alternating fashion so the all the bolts are tightened about the same amount at the same time.
Step 10. Move to the next Filter Vessel and needs this operation
Step 11 Repeat Step 2 through Step 9 for this vessel and repeat as required until all the vessels have been worked on.
Step 12. Slightly reopen V10 to where is had been in Step 1 and recheck the ED paint flow meter. Adjust as required so the proper flow rate is shown.

*Changing Bag Filters - **

Situation: Bag Filters should be changed then the ED paint flow has dropped off by say 10 gpm, or the delta p is 5-7 psi (P1 and P4).

Goal: Change each of the Bag Filters on at a time, but keep the UF System in Operation.

Persons required: 1

Tools/Materials Required: 1 x clean glazed filter bag/vessel, clean dilute ED paint cleaning solution and clean rags

Important ED Machine Valve Positions
UF Machine is ONLINE.

Follow Checklist.
Step 1. Close V10 slightly so that the ED paint flow has been reduced by ~70 gpm (i.e. ED paint flow going through one Bag Filter vessel).
Step 2. Close V26-* valve and then Close V25-* valve to isolate the Filter Vessel '*'.
Step 3. Open V27-* and Open V28-* valve to allow the paint to drain from the vessel back to the ED tank.
Step 4. Close V28-* valve.
Step 5. Close V27-* valve.
Step 6. Open the vessel and remove the old filter bag.
Step 7. Use cleaner and a new rag to wipe out the ID of the filter vessel taking care to clean the region where the ring of the filter bag has to seal up against the ID of the vessel. Place new glazed bag and make sure seal is properly set.
Step 8. Wipe the O-ring of the vessel to remove any dirt bits and replace the top cap of the vessel.
Step 9. Tighten the top cap of the filter bag vessel in an alternating fashion so the all the bolts are tightened about the same amount at the same time.
Step 10. Move to the next Filter Vessel and needs this operation
Step 11 Repeat Step 2 through Step 9 for this vessel and repeat as required until all the vessels have been worked on.
Step 12. Slightly reopen V10 to where is had been in Step 1 and recheck the ED paint flow meter. Adjust as required so the proper flow rate is shown.

*Monthly Permeate Flushing of UF Module **

Situation #1: UF Machine is working and it is the first Thursday (or some other day of the week) of the month. It is time to permeate flush UF Module A. On the next Thursday, the next UF Module should be permeate flushed and so on.

Goal: Perform a short, 5 minute permeate flush followed by a longer 60 minute permeate flush.
Persons required: 1 Tools/Materials Required: None

Important ED Machine Valve Positions
All valves are in Normal operating position.

Primary Checks
Make sure the CIP tank is clean and there is no dirt inside of it.
Check CIP Y strainer for dirt bits every 2 months or as required.
Confirm chilled water system is working and Cooling set point dial is 100 deg F or lower as required.

Preparation
Install a new glazed filter bag in the CIP filter vessel.
Make Fill the CIP tank with permeate.
Close V7 valve

Checklist
Step 1. Throttle back the V10 valve so that the paint flow rate is reduced by ~70 gpm
Step 2. Fill CIP tank by opening V14 valve.
Step 3. Slowly Close V5-* valve taking 3 – 5 seconds. **Immediately** afterwards, Close V3-* valve.
Step 4. Open V2-* valve, Open V13 valve, and Close V1-* valve
Step 5 Open V4-* valve and V6-* valve, open V21 and crack open V20.
Step 6. Close V15 & V 23 valves, Open V8 valve and Close V7 valve.
Step 7. Start CIP pump and take 10 seconds to fully Open V7 valve. Flush for 10 minutes. Turn off CIP pump and Close V7 valve. Do the following to keep the ED solids low in the CIP tank: Throttle Open V21 valve to the same flow rate the is incoming permeate from V14 valve. When the returning CIP fluid is clear: Open V20 and Close V21 valve. Close V14 valve.
Step 8. Turn OFF PUMP at Panel then Drain CIP tank and refill with fresh permeate from V14 valve. Start CIP pump and take 10 seconds to fully Open V7 valve. Flush for 60 minutes or until the CIP turns off due to high CIP fluid temperature. Stop CIP pump and Close V7.
Step 9.Open V15 valve and V23 valve to drain CIP tank/filter vessel. Remove filter bag from CIP filter vessel, wipe out inside to clean vessel to keep vessel inside's clean.
Step 10. Close V4-* valve, Close V6-* valve and Close V2-* valve.
Step 11. UF Element * has been flushed and the UF Module * is ready to be brought back on line.
Step 12. Open V1-* valve.
Step 13. Slowly Open V3-* valve taking 3 to 5 seconds and **immediately** Open V5-* valve slowly talking 5 seconds to fully open. If you open V5-* too quickly or forget to Open V3-* first, then you may damage the UF Element.
Step 14. Observe the permeate flow through the F-* flow meter, make sure it is clear and normal looking.
Step 15. Slowly begin to Throttle Open the valve V10 valve taking a *Full 20 seconds*. Stop opening the valve once the TigerMag flow meter reads the appropriate value.
Step 16. Check P2 to insure you still have 10 – 15 psi, if not, alternately slightly close V9 valve and Open V10 valve a little. Repeat as required until P2 reads between 10 – 15 psi and the TigerMag flow meter reads as required.
Step 17. UF Machine is now in 'Normal working mode' and you are finished.

TruFlux UF Machine Operator Checklists:

Normal Operating Parameters

ED paint flow is (# UF Modules x 70 gpm) x ~1.05.
P2 pressure gage reading is 10 to 15 psi
Typical pressure drop across P1 to P2 is 25 PSI minimum
Standard permeate rate per UF Module is 2.5 gpm +/- 10%

*Replacement of a UF Element - **

Situation #1: The permeate flux rate has fallen so low that the decision is made to replace the UF Element-*.

Goal: Replace the UF Element in UF Module - *. Generally it is best to change all the UF Elements at the same time in order to keep the flow resistance through each UF Module about the same.

Persons required: 2 Tools/Materials Required: 1-1/4" socket, 11/16" deep well socket, UF Element, 20 ml of glycerin, UF Element seal insertion (like a shoe horn), Vice Grip, gloves

Important ED Machine Valve Positions
All valves are in Normal operating position.

Preparation
Take the UF Module to be worked on 'Offline' and rinse out the ED paint solids by following the "Monthly Permeate Flushing of UF Module * Operation Checklist" stopping at Step 5.

Checklist
Step 1. Use your hand to loosen the bottom union of the permeate flow meter F-* assembly of the UF Module * (Do not LOSE O-Rings). Set this piping aside in a place where it will not be damaged as it is delicate.
Step 2. Use the large 1-1/4" socket to loosen the 2 bolts that secure the 8" groove clamp on the top side of the UF Module *. Set the clamp and hardware aside. Push the groove gasket down until the top of the gasket is flush with the top of the PVC body (i.e. 8" PVC pipe portion).
Step 3. Take the 11/16" socket and loosen the 1-1/2" groove clamp between the ED paint outlet of UF Module * and the PVC outlet piping. Set the clamp and hardware aside. Push the groove gasket away from you until the closest edge to you is flush with the PVC outlet piping.
Step 4. Remove the Top Cap of UF Module * and set aside.
Step 5. Remove the Top Cap adapter (UFS PN 090085) if it did not come out in Step 4 and set aside.
Step 6. Grab Plastic ATD with Vice Grips and then pull upward.
Step 7. Use a clean lint free cloth soaked with permeate to remove any paint solids from the ID of the UF PVC Housing - *. Add enough fresh permeate so that at least 1/3 of the UF Module PVC body is filled.
Step 8. Open the replacement UF packaging. Replace the two O-rings (UFS PN 565024) on the Bottom Plug. Replace the same two O-rings on the Permeate Adapter and the other two larger O-rings (UFS PN 565022). Use your finger to apply glycerin to all the O-rings. (On a male type UF Element install 2 x UFS PN 565022 o-rings on the permeate extension pipe if required)
Step 9. The end of the UF Module with the seal will be the top and so place the Bottom Plug in the other end. If the seal is a lip or cup style then make sure the underside of the lip or cup is facing down. If this is not done, then ED paint will be able to bypass the UF membrane and permeate production will be very low.
Step 10. Add provided glycerin to the ID of the Housing and to the Lip seal. Have 2 persons lift the UF Element and slowly let the UF Element slide into the UF Module - *, do not let it drop.
Step 11. Take the UF Seal insertion tool and slide it into the gap between the ID of the UF Module Body and the seal on the OD of the UF element. Move this tool around the ID of the housing and insure that the seal is facing down and not tuned up. If the seal is turned up ED paint will leak past this point and reduce the permeate production. Once the seal is properly installed push the UF element down until the Bottom Plug bottoms out.
Step 12. Remove the seal insertion tool. Push the Top Cap on the Permeate Adapter/UF Element permeate extension pipe (add glycerin to each) until the bottom side of the Top Cap touches the top of the UF Module Body. Make sure the outlet of the Top Cap is aligned with the paint out PVC piping and the 1-1/2" groove gasket is on the PVC groove fitting. Also the 8" groove gasket must be on the PVC UF body.
Step 13. Pull the 8" groove gasket up so it is centered where the bottom of the Top Cap and top of the UF Module Body touch. Install the 8" groove clamp and tighten the hardware in an alternating fashion. You must alternate the tightening of the bolts for the gasket to seat properly. Failure to do this may result in a ED paint leak and damage to the UF machine.

Step 14. Center the 1-1/2” groove gasket and tighten alternately.
Step 15. Reattach the permeate outlet flow meter and piping – remember to hand tighten this. Do not use tools as the flow meter can be broken with excessive force.
Step 16. The replacement UF Element - * is now in place and needs to be flushed twice (if shipped with preservatives) to remove the preservative used for shipping. If the UF Element is shipped dry then you only need to flush it once to fill it up with permeate before it is brought online.
Step 17. Locate the checklist for ‘Double Permeate Flush of the new UF Elements - *’ and continue there. You are finished with this checklist.

*Double Permeate Flushing of new UF Element in UF Module **

Situation #1: The UF Element for UF Module * has been changed and needs to be flushed to remove the preservatives.

Goal: Perform a short, 5 minute permeate flush followed by a second 5 minute permeate flush.

Persons required: 1 Tools/Materials Required: None

ED Machine Valve Positions
UF Element - * has been changed and it needs a double flush.

Primary Checks
Make sure the CIP tank is clean and there is no dirt inside of it.
Check CIP Y strainer for dirt bits every 2 months or as required.

Preparation
Install a new glazed filter bag in the CIP filter vessel.
Make Fill the CIP tank with permeate.
Close V7 valve

Step 1. Continue from Step 17 of 'checklist entitled 'Replacement of UF Element - *'
Step 2. Close V15 valve and Open V8 valve. Start CIP pump and take 10 seconds to fully Open V7 valve. Flush for 5 minutes. Stop CIP pump and Close V7.
Step 3. Drain CIP tank, refill with fresh permeate. Start CIP pump and take 10 seconds to fully Open V7 valve. Flush for 5 minutes. Stop CIP pump and Close V7.
Step 4. Close V4-* valve, Close V6-* valve, and Close V2-* valve.
Step 5. Close V7 valve. Remove filter bag from CIP filter vessel, wipe out inside to clean vessel to keep vessel inside's clean.
Step 6. UF Module * has been flushed and the UF Module A is ready to be brought back on line.
Step 7. Open V1-* valve.
Step 8. Slowly Open V3-* valve taking 3 – 5 seconds and immediately Open V5-* valve slowly talking 5 seconds to open.
Step 9. Observe the permeate flow through the F- * flow meters, make sure they are clear and normal looking.
Step 10. Slowly begin to Throttle Open the V10 valve taking a *Full 20 seconds*. Stop opening the valve once the TigerMag reads 145 gpm +/- 2 gpm.
Step 11. Check P2 to insure you still have 10 – 15 psi, if not, alternately slightly close V9 valve and Open V10 a little. Repeat as required until P2 reads between 10 – 15 psi and the TigerMag reads 145 gpm +/- 2 gpm.
Step 12. UF Machine is now in 'Normal working mode' and you are finished.

Normal Operating Parameters
ED paint flow is (# UF Modules x 70 gpm) x ~1.05.
P2 pressure gage reading is 10 to 15 psi
Typical pressure drop across P1 to P2 is 25 PSI minimum
Standard permeate rate per UF Module is 2.5 gpm +/- 10%

Single UF Module- Restart*

Situation: One UF Element is offline because it was replaced and doubled flushed and ready to be placed online.

Goal: Restart this offline or resting UF Element to increase permeate production.

Persons required: 1 Tools Required: None

Important ED Machine Valve Positions
UF Machine valves are in Normal operating condition except for the UF Element for UF Module * that is offline. V3-* valve and V5-* valve are Closed.

Primary Checks
Make sure the UF Element is flushed (twice if new) and resting in permeate or buffered RO water.

Checklist
Step 1. Close V4-* valve, Close V6-* valve, and Close V2-* valve.
Step 2. Open V1-* valve.
Step 3. Slowly Open V3-* valve taking 3 to 5 seconds and immediately Open V5-* valve slowly talking 5 seconds to fully open. If you open V5-* too quickly or forget to Open V3-* first, then you may damage the UF Element.
Step 4. Observe the permeate flow through the F- * flow meter, make sure it is clear and normal looking.
Step 5. Slowly begin to Throttle Open the valve V10 valve taking a *Full 20 seconds*. Stop opening the valve once the TigerMag reads 145 gpm +/- 2 gpm.
Step 6. Check P2 to insure you still have 10 – 15 psi, if not, alternately slightly close V9 valve and Open V10 valve a little. Repeat as required until P2 reads between 10 – 15 psi and the TigerMag reads 145 gpm +/- 2 gpm.
Step 7. UF Machine is now in 'Normal working mode' and you are finished.

TruFlux Ultrafiltration Machine Piping Schematic