PADDOCK
POOL EQUIPMENT COMPANY

JOB NAME, CITY, STATE

Type of pool if required

Horizontal Pressure Sand Filter System is:

Two Stacked Filter Tanks - Dual Cells - Manual Valves

Introduction

A pressure sand filter is one in which the water to be filtered is pumped through a layer of sand contained within a pressure vessel. High flow sand filters are designed for filtering rates of up to 20 gallons per minute per square foot of filtering area. This filter system will, with proper care and maintenance, give trouble-free and efficient operation.

The filtering principle is simple. Fine sand is used to filter out all of the dirt suspended in the water. Pool water is forced by the pump through a distributor system in the top of the filtering tank. This distributor system is designed to maintain a uniform flow downward through the sand and out a second collector system in the bottom of the tank.

In sand filtration, at these high rates, penetration or depth filtration occurs within the sand; the dirt entrapped in the water passes down several inches into the sand rather than being collected on the surface of the sand or in a bed of alum as in the lower rate rapid sand pressure filters.

When dirt accumulates in the sand the influent pressure increases. When the desired flow rate can no longer be maintained, the filter is cleaned by simply reversing the flow. High rate sand filtration is possible through the proper internal design of the filter. So long as the flow, either upward or downward, is uniform without jets or eddy currents, these high rates may be maintained without disrupting the filter bed.

This system is designed to run 24 hours a day. Filter cycles will vary. Bathing loads, suntan lotions and wind conditions, among other things, create variances in the filter cycle. Health departments in many areas maintain and exercise sanitary procedures; nevertheless, even though the flow rate is maintained, we recommend that the filters be put through the backwash cycle when the differential pressure between the influent and effluent reaches 10± psi or when the designed flow rate cannot be maintained (whichever occurs first). This will keep the filter in excellent, healthful, maintenance-free operation, year-in and year-out. Any backwash requirements of local or state regulatory agencies should also be met. The filters are usually cleaned in two to four minutes by reversing the flow of the water.

Initial Start-Up:

The following steps are to be taken when you place your high flow filter in operation for the first time:

1. Check pump strainer. Make sure it is clean and full of water.

2. Check pump rotation to ensure that the motor has been correctly wired.

   Note: the impeller should rotate in a clockwise direction when viewed from the motor end. If rotation is opposite, the motor has been incorrectly wired.

3. Set the filter for backwash (see operating instructions). Backwash a minimum of (2 - 4) minutes to clean the filter media or Backwash until the sight glass runs clear.

In many areas when a new pool is filled, the water will appear green and/or cloudy. This green and/or cloudy appearance can be caused by plaster fines present in the water, traces of iron or organic matter, algae in the make-up water or by a combination of all. This type of contamination always will clog any type filter in a relatively short period of time.

If any appreciable amounts of iron or other metals are present, they may turn the pool water brown upon chlorination and stain the interior finish of the swimming pool. The pool water supply should be laboratory tested and the water should be treated to remove the iron or other materials found in it before filling and/or super-chlorinating.

It is recommended that the pool be super-chlorinated immediately after filling and that the filter be backwashed promptly when the differential pressure between the influent and effluent reaches 10+ psi or when the designed flow rate cannot be maintained. If this procedure is followed, the pool will be cleaned up in a minimum of time. After super-chlorination, do not enter the pool until chlorine level has returned to normal.

The backwash operation may be required daily or several times a day for the first few days until the water becomes a sparkling blue. After the cloudiness and/or green appearance is gone, you need only backwash as covered elsewhere in this manual. Check the pump strainer, the converter strainer basket and any skimmer baskets daily and clean as required, establishing regular schedules.

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Operating Instructions

Valve Legend:

All normal functions of the filter(s) are controlled by wafer valves. It is good practice to stop the pump and motor before changing the position of the valves. For convenience in operation, all valves have been tagged and correspond with the filter valve legend on the filter drawings.

1. MAIN DRAIN	5. FILTER INFLUENT- CELL 2
2A. RETURN TO POOL- TANK A	6. BACKWASH EFFLUENT- CELL 2
2B. RETURN TO POOL - TANK B	7. FILTER INFLUENT- CELL 3
3. FILTER INFLUENT-CELL 1	8. BACKWASH EFFLUENT- CELL-3
4. BACKWASH EFFLUENT-CELL 1	9. FILTER INFLUENT- CELL-4
	10. BACKWASH EFFLUENT- CELL-4

Valves #2A & #2B are open for filter mode, closed for backwash mode. Valves #3, 5, 8 & 9 are open for filter and closed for their respective cell's backwash. Valves #4, 6, 7 & 10 are closed for filtration and open for their respective cell's backwash.

Checking the Flow Rate:

The re-circulating pump is designed to deliver the designed flow rate of 406 GPM **GPM** at a total minimum dynamic head of 116 **Feet** each. Total head on the pump is the combination of the vacuum and discharge pressure losses. The conversion factors for the vacuum and pressure reading to feet of head are:

1. One inch of vacuum equals 1.13 feet of head.
2. One psi equals 2.31 feet of head.

HEAD LOSS	
All models	2.5 psi @ 15 GPM

* Clean filter loss through internal piping and media.

Procedure: (Assume a newly backwashed filter)

1. Set the system to filter position.
2. Read the vacuum gauge.
3. Convert vacuum reading to feet of head by multiplying by 1.13.
4. Subtract the results of No. 3 from the design head of your pump.
5. Divide the results of No. 4 by 2.31. This gives the pump discharge pressure to obtain the desired total dynamic head and, hence, the designed flow rate. (You will need to throttle valve #2 or pump discharge valve.)
6. Should the vacuum reading drop appreciably, repeat steps 2 through 5.

Like a properly installed flow meter, a pump performance curve is guaranteed accurate within 5%. Flow meter installations vary, thus when pump pressures are set as described here, the flow meter reading should be noted as the proper recirculation rate, regardless of its actual reading.

EXAMPLE OF CALIBRATION

Calculating TDH and determining flow from pump performance curve

Using your Vacuum gauge and Pressure gauge on the gauge panel, calculate your TDH at current operational load. By using the example below you can determine the flow (GPM) of the pump and can calibrate your flow meter to correspond to your current flow.

Example:

Vacuum Gauge Reading (4 in.Hg) x 1.13 = 4.52

Pressure Gauge Reading (22 psi) x 2.31 = 50.82

To calculate TDH, add the vacuum gauge reading from the pressure gauge reading to determine
your TDH. Example:

Pressure Gauge (22 psi) x 2.31 = 50.83
+ Vacuum Gauge (4 in.Hg) x 1.13 = 4.52
= TDH of 55.35

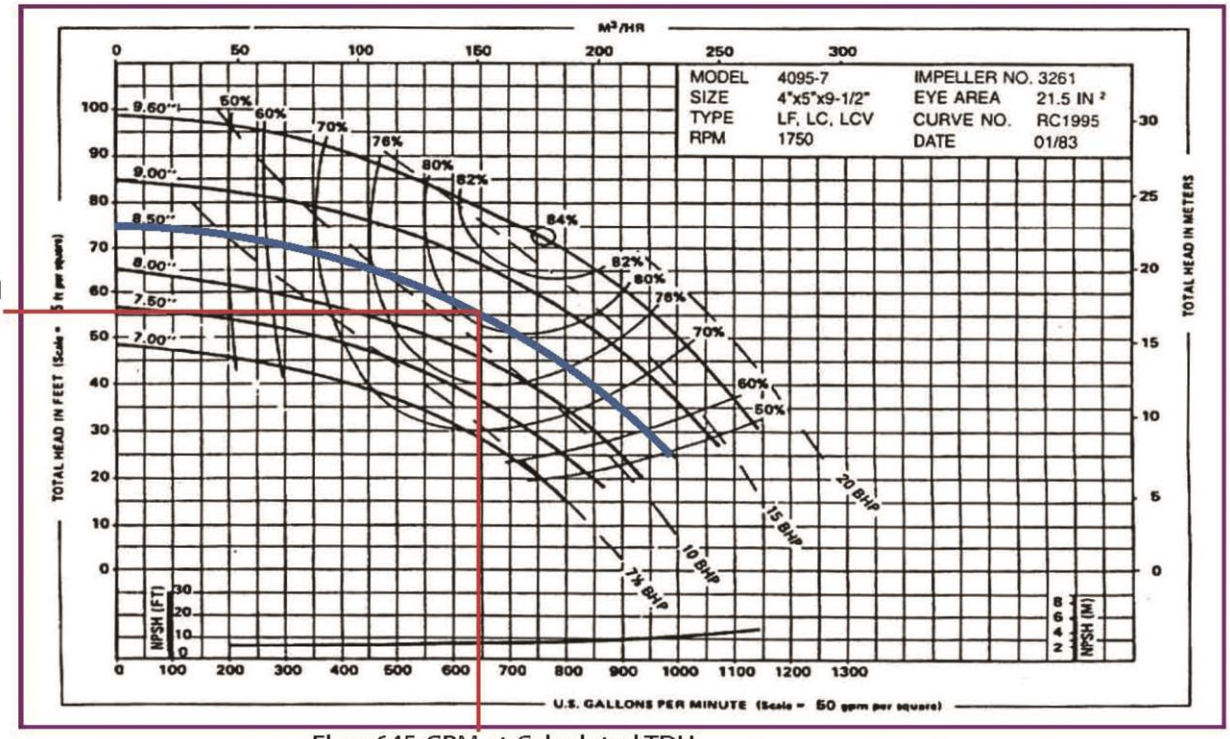
Use the example performance curve below to determine flow (GPM) with calculated TDH. Please notice the blue curve is the installed pump performance line and the red line indicates the TDH and Flow intersection on the performance curve.

PACO PUMPS

LC - 40957 - 1750 RPM - Performance Curve

Project:	Tag #	P.O. #	By:
Location:	Model: **40957**	Cust Ref#	Date: **2/23/2010**
Contractor:	Stages: **1**	Agent/Rep:	Rev. #
Engineer:	Service:	Doc #	Qty:

Calculated TDH
55.35 (TDH)



Flow 645 GPM at Calculated TDH

When initially starting the filter system up, record the normal influent and effluent pressures with a clean filter operating at the prescribed filter flow rate.

Influent Pressure_____ **Effluent Pressure**_____

Flow Rate: 406 GPM GPM

To Filter Pool:

Open valve #1, place manual valves in filter position and start the pump.

In operation, valve #1 is open and flow is balanced from the perimeter overflow channel (PO) and the main drain. To balance the flow with the filter set in the "filter" mode, slowly close valve #1 to set the minimum operating level (MOL) in the surge tank. Note and record the number of turns or which notch the handle is in, to facilitate resetting the main drain valve when necessary. Using valve #2A & #2B set the re-circulating pump to the designed re-circulating rate and readjust valve #1 as necessary.

As activity increases in the pool, more water will flow from the PO channel, causing the water level in the surge tank to rise. This increase in water level in the surge tank will increase the head on the main drain line and less water will flow through valve #1 from the main drain and the system will balance.

To Clean The Strainer:

Slowly close isolation valve downstream of pump, then stop pump. Close isolation valve upstream of the strainer. Remove cover and clean basket. Be sure strainer is filled with water after cleaning. Replace cover tightly. Open upstream valve and start pump. Slowly open valve downstream of pump. Establish a regular schedule for checking the strainer.

To Backwash Filter:

Backwash rate is: 1312 GPM GPM PER CELL

As the filter becomes dirty the flow rate drops and valve #2A & #2B should be opened as required to maintain flow.

The filter should be backwashed when the differential pressure reaches 10 ± psi, or the flow rate can no longer be maintained.

All chemical systems, heaters and auxiliary pumping equipment should be shut off 15 minutes prior to backwash. Heater isolation valves should be closed just prior to backwashing.

Manual

Shut off pump, with Tank 'B' valves in filter position, manually close valves #2A, #3 and # 6, open valve #5 and #4 to Cell #1 backwash position and restart pump. Continue backwashing Cell #1 until water runs clear in the sight glass (usually 2 to 4 minutes). Shut off pump, with Tank' B' valves still in filter position & valve #2A closed, close valves #4 & #5 open valves #3 & #6 to Cell #2 backwash position and restart pump. Continue backwashing Cell #2 until water runs clear in the sight glass. Shut off pump. Position Tank 'A' valves to filter. Close valves #2B, #8, & #10, open valves #9 & #7 to Cell#3 backwash position and restart pump. Continue backwashing Cell #3 until water runs clear in the sight glass. Shut-off pump, with Tank 'A' valves still in filter position and valve #2B closed, close valves #7 & #9, open valves #8 & #10 to Cell #4 backwash position and restart pump. Continue backwashing Cell #4 until water runs clear in the sight glass. Shut off pump. Reset all valves in filter position and restart pump to return to normal operation. Return to pool valves #2A & # 2B, should be set to the mark established during set up, the designed flow rate.

To Empty Pool With Pump And Motor:

Shut off pump, close valves #2A, #2B, #5, #6, #9 & #10 and open valves #3, #4, #7, & #8 to bypass the filter system. Start pump. Maintain a positive pressure at all times with valve #3 & #8. Exercise every possible care in this operation to prevent air from entering the main drain line or other piping, as this will cause the pump to lose its prime. It is advisable, when emptying the pool (unless the pump is located beneath the lowest point of the pool), to complete the operation without interruption, inasmuch as turning off the pump and motor will normally result in loss of prime. However, if it becomes necessary to interrupt the emptying operation, close valve #3 & #8 first, then close the main drain valve #1 before stopping the pump and motor. When continuing the operation, turn on the pump and motor; open the main drain valve, then open valve #3 & #8 slowly.

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Calculations and Notes

For further information contact us below.