

ALAB, LLC

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12" x 12" DIFFUSER OPERATION

1. Install and submerge diffuser. Diffuser should be parallel to the water surface for best efficiency. Recommended set up should include a condensate drain line in the gas supply line at the lowest point of the diffuser manifold as shown in the diagram.
2. The diffuser consists of a diffusing membrane laminated to a support base. The membrane permits gas flow but resists water flow. Water that has condensed in the gas line can block the flow of gas through the pores of the membrane. Sometimes, because of impatience with the delay in obtaining the desired gas flow, there is a risk of increasing the gas pressure to damaging levels. Excessive pressure can cause membrane delamination. Water should be drained from the gas line, and on startup sufficient time must be allowed for the gas to force out any water in the membrane pores.
3. On startup, if the diffuser is dry, allow 30 minutes for the surface to wet.
4. Open condensate drain to remove any water in the gas supply line. Start air or oxygen supply slowly to allow condensate to purge through the drain and to allow pores of the diffuser to open.
5. Slowly close condensate drain.
6. Maintain 4 psi at diffuser surface for 10 - 30 minutes. **CAUTION: NEVER EXCEED 4 PSI (111 INCHES OF WATER) DIFFUSER SURFACE PRESSURE DROP (DWP).**
7. Adjust flow as required to between 0 and 60 SCFH. Recommended flow is less than 30 SCFH or 14 L/Min. The bubble quality will continue to get better as the material thoroughly wets. The best bubble quality will be observed about 24 hours after wetting surface and establishing a consistent flow rate. *See notes below.

Diffuser surface pressure drop is also known as Dynamic Wet Pressure (DWP)

$$DWP = SP - dP_{sub} - dP_{ox} - dP_{line}$$

Where;

SP = Air or oxygen supply pressure in inches of water (psi x 2.768 = inches H₂O).

dP_{sub} = Diffuser water depth in inches (top of diffuser to water surface).

dP_{ox} = Orifice pressure drop in inches H₂O from table enclosed.

dP_{line} = Pressure drop between pressure gauge and diffuser orifice due to pipe line frictional loss in inches of water.

For example: If the diffuser is 50 inches below the water surface, the orifice pressure drop is 5 inches of water, and the pressure drop in the line is 2 inches, then the gas supply pressure should never exceed 111 + 57 or 168 inches (6.1 PSI).

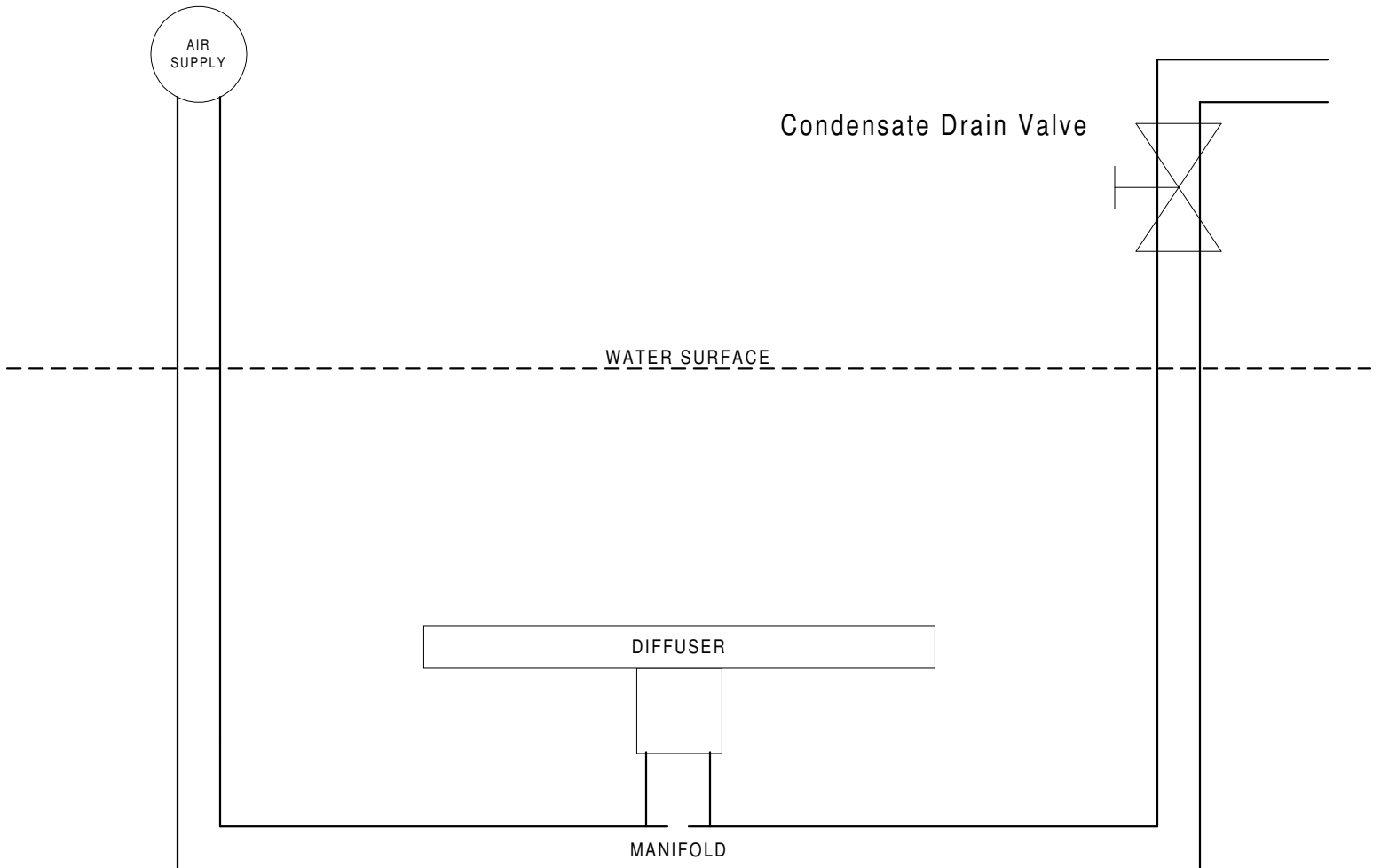
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The goal in obtaining higher efficiencies for aeration or oxygenation of municipal water, wastewater or aquaculture tanks and ponds, is to reduce the gas flow and pressure so that less pumping energy is needed. With Alab diffusers, the required gas flow can be reduced because smaller bubbles have a larger surface area than the same volume of gas in larger bubbles. The larger surface area means that the gas dissolves faster in the liquid. The pressure drop through Alab Micro-fine bubble diffusers is approximately 1- 2 PSI. This is much lower than competitive fine bubble diffusers that typically require 30 PSI produced by more expensive pumps with greater electric consumption.

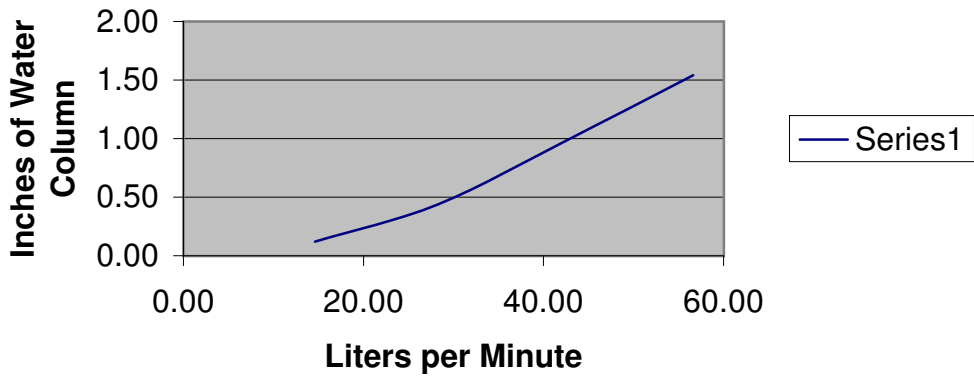
Another benefit of small bubbles is that they rise more slowly in the liquid than larger bubbles. This is due to an increase in the friction ratio of gas to liquid. The term friction is used because it is easier to visualize the slower rising bubble slowed by friction. For an example picture one large bubble about one inch in diameter. Imagine how fast that single bubble would rise through a body of water. Now contrast that single large bubble with thousands of bubbles about one half millimeter in diameter released into the same body of water at the same time and depth. These tiny bubbles resemble smoke as they rise. The multitude of smaller bubbles would reach the surface much later than the large single bubble. This increase in friction with the liquid means that the gas bubbles can drag more liquid along as it rises therefore creating greater lift per volume of gas.

** Be sure to register your diffusers for Warranty coverage.

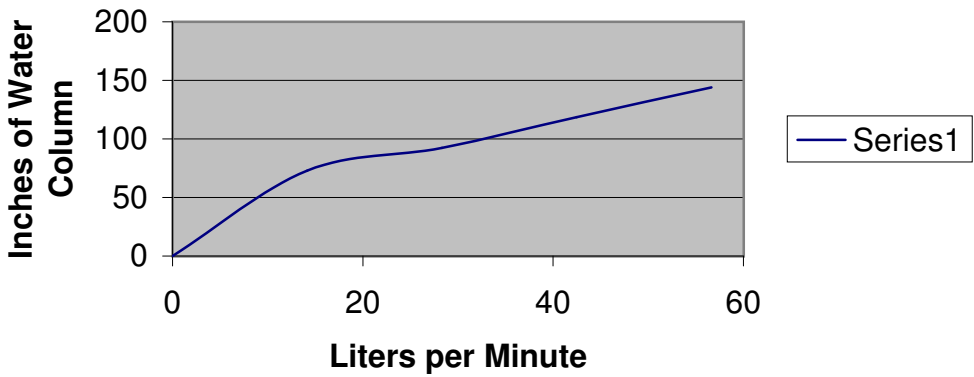
DIFFUSER MANIFOLD SETUP



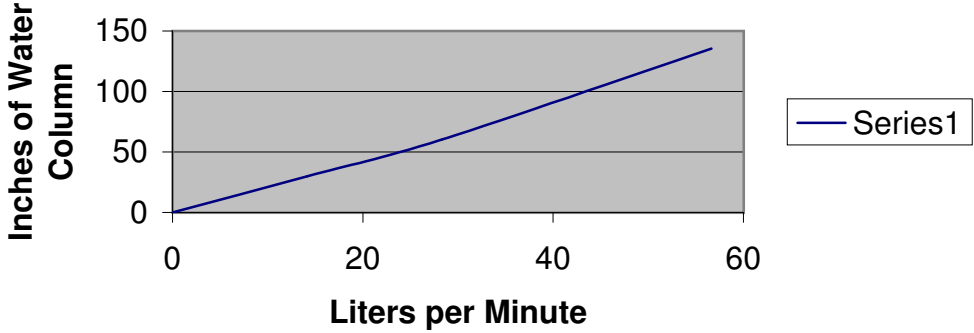
12x12 Orifice Only LPM



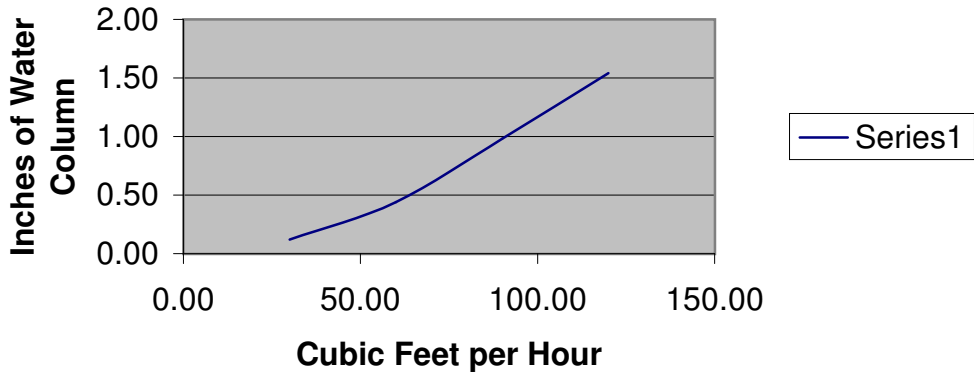
Navy 12x12 Start Up w/ Orifice LPM



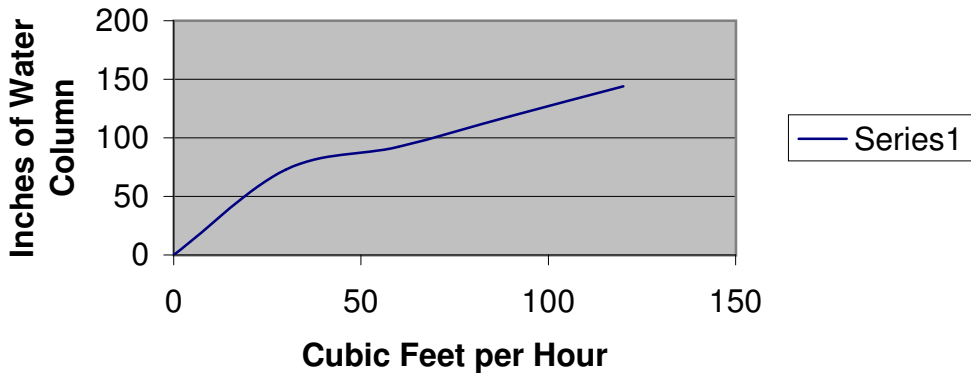
Navy 12x12 Established Flow w/ Orifice LPM



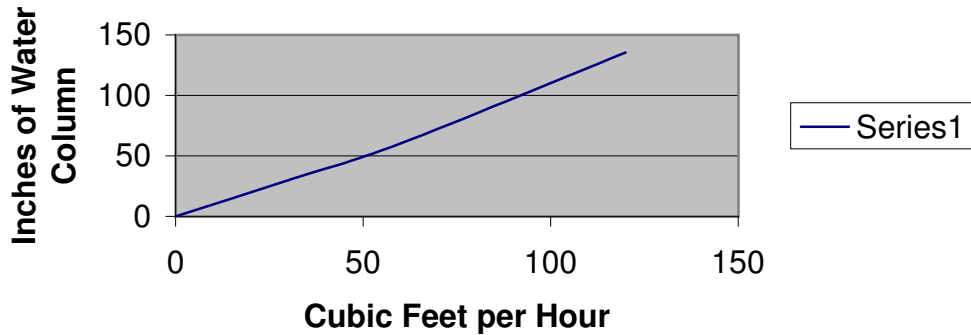
12x12 Orifice Only CFH

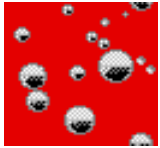
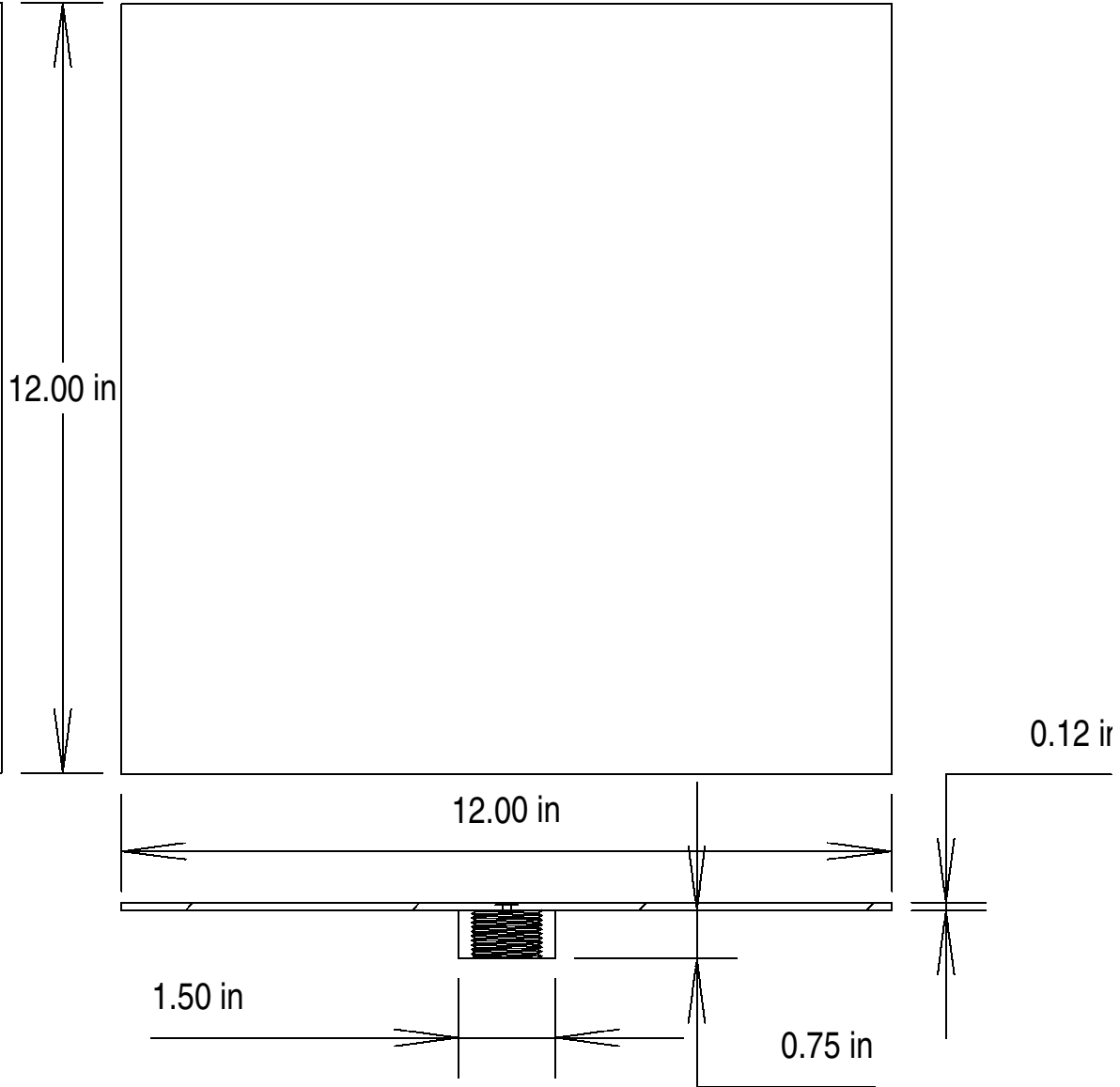
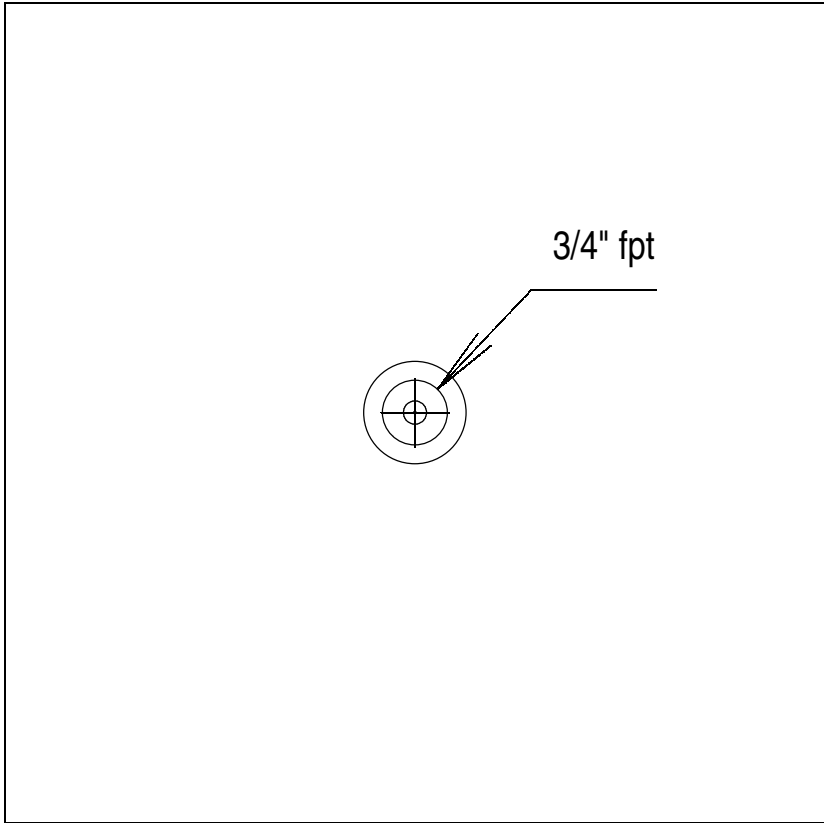


Navy 12x12 Start Up w/ Orifice CFH



Navy 12x12 Established Flow w/ Orifice CFH





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LIMITED WARRANTY

Alab warrants to the end user of this Product that the Product will be free from defects in material and workmanship for a period of 90 days from the date of shipment by Alab. The sole remedy for breach of this limited warranty is the repair or replacement of the Product or refund of the purchase price paid for the product. At Alab's discretion, Alab will repair or replace the Product or refund the purchase price paid for the Product found to be defective in material or workmanship during the warranty period.

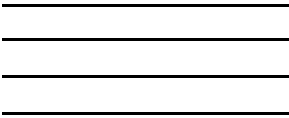
This warranty shall not apply to:

1. Products damaged in transit
2. Products damaged by excessive pressure, misuse, abuse, negligence, or modifications made by others than Alab;
3. Products damaged by improper or inappropriate installation.

THIS WARRANTY IS EXCLUSIVE AND SHALL REPLACE ALL OTHER WARRANTIES, INCLUDING ANY WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE AND THE WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL ALAB BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, OR CONSEQUENTIAL DAMAGES.

Warranty Claim Instructions: To make a claim under this Limited Warranty, please return the Product, shipping prepaid, with a description of the problem, to:

ALAB, LLC
27 Boulder Creek Drive
Rush, NY 14543



Please
Affix
Proper
Postage

Alab, LLC
27 Boulder Creek Dr.
Rush, New York 14543
USA

FOLD HERE

Registration Information

Name _____ Postal Code _____
Company _____ Country _____
Address _____ Phone No. _____
City, State _____ E-mail _____

Product Information

Diffuser Model _____ Serial Number(s) _____
12x12s _____ Serial number range may be used for multiple registrations
12x12FRP _____ Invoice Number _____
2.5x12 _____ Date Installed _____

FOLD HERE

Intended Use

Field of Use _____ Liquid Into Which The Gas Is Diffused _____
Aquaculture _____ Water _____
Wastewater _____ Salt Water _____
Water Treatment _____ Waste Water _____
Flotation _____ Industrial Process _____
Other _____ Other _____

Gas To Be Diffused _____
Oxygen _____
Air _____
Other _____