ALAB, LLC
27 Boulder Creek Drive, Rush, NY 14543 585-533-2115
sales@alabdiffusers.com www.alabdiffusers.com

2½" x 12" DIFFUSER OPERATION

1. Install and submerge diffuser. Diffuser should be parallel to the water surface for best efficiency.

2. On startup, if the diffuser is dry, allow 30 minutes for the surface to wet.

3. 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. The 2½" x 12" diffuser does not have a check valve as does the 12x12s diffuser and therefore when the gas supply is off and the diffuser is submerged the supply line may fill with water. If this occurs, slowly bring pressure up to 2 psi (55.5 Inches WC) DWP and allow gas to be emitted from surface then slowly bring pressure to 4 psi (111.0 Inches WC) DWP. DWP is defined below. Maintain this pressure until flow is established at 50% above desired flow then reduce pressure / flow to desired level. It may take several hours to establish the 150% flow rate.

4. CAUTION: NEVER EXCEED 4 PSI (111 INCHES OF WATER) DIFFUSER SURFACE PRESSURE DROP (DWP).

5. Adjust flow as required to between 0 and 6.35 SCFH or 3.0 LPM. Recommended flow is much less than 4 SCFH or 2.0 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 regarding flow rates**.

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

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

   Where;

SP = Air or oxygen supply pressure in inches of water (psi x 27.68 = inches H_2O).
dP_{sub} = Diffuser water depth in inches (top of diffuser to water surface).
dP_{line} = Pressure drop between pressure gauge and diffuser due to pipe line frictional loss in inches of water in most cases "0" may be used. (the larger the ID of the supply tubing and the lower the flow rate the less this number will be).

Max SP = $DWP + dP_{sub} + dP_{line}$

For example: If the diffuser is 50 inches below the water surface and the pressure drop in the line is 0 inches, then the gas supply pressure should never exceed

161 In. WC. = 111 In. WC. (*from line 6 above*) + 50 In. WC. + 0 In. WC.
161 In. WC. / 27.68 = 5.8 psi

* Flow Rates
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 or expensive oxygen 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.

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

2.5x12 Diffuser

1 Hour Soak

Start Up

Flow LPM	Press In WC
0.100	33.5
0.200	40
0.300	44.5
0.400	46.5
0.500	48.5
0.600	50.5
0.700	52
0.800	54
1.000	56
1.200	58.5
1.400	60.5
1.600	63
1.800	66
2.000	68
2.200	70
2.400	73
2.600	74
2.800	76
3.000	78

Turn Down

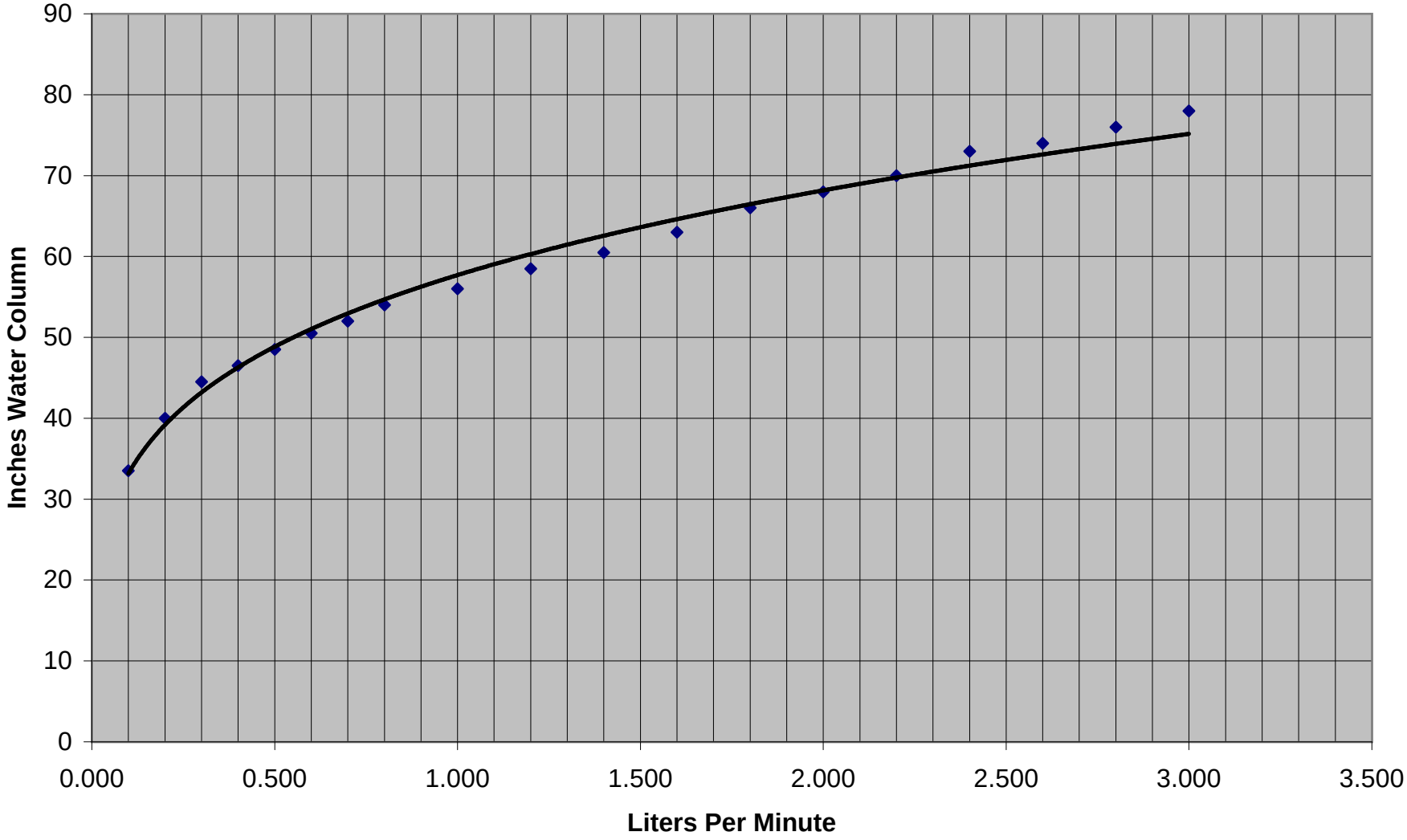
Flow LPM	Press In WC
3.000	78
2.800	70
2.600	65
2.400	58
2.200	53
2.000	48
1.800	42.5
1.600	38.5
1.400	34
1.200	30
1.000	26
0.800	24
0.700	22
0.600	20
0.500	18
0.400	16
0.300	13.5
0.200	11
0.100	9
0.050	7.5

24 Hour Soak

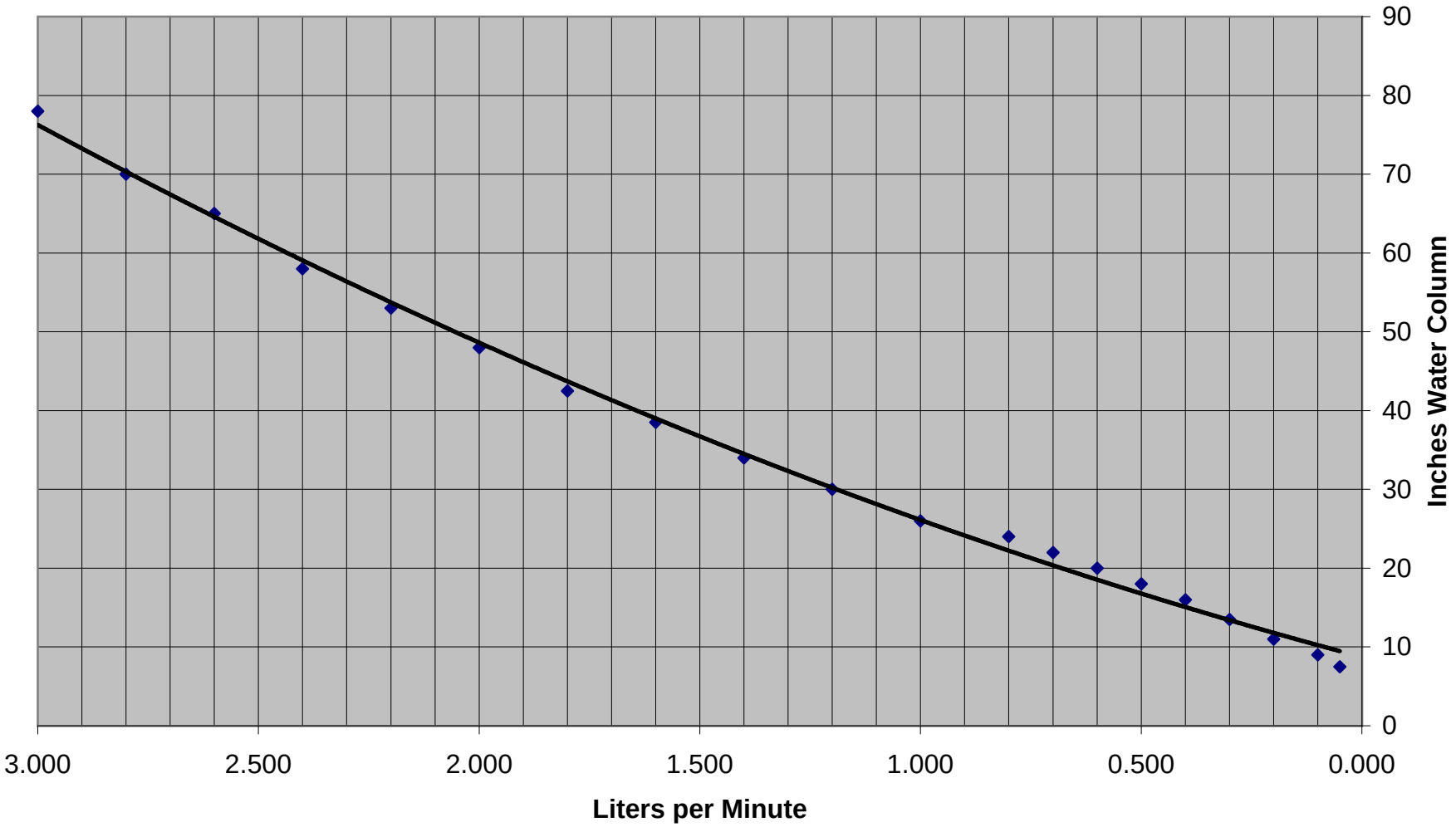
Turn down from 150% (4.5 LPM)

Flow LPM	Press In WC
3.000	104.5
2.800	96.25
2.600	90.75
2.400	82.5
2.200	74
2.000	66
1.800	60
1.600	53
1.400	46
1.200	40.5
1.000	36.25
0.800	32
0.700	29.25
0.600	26.25
0.500	23.25
0.400	20.25
0.300	17
0.200	13.25
0.100	10

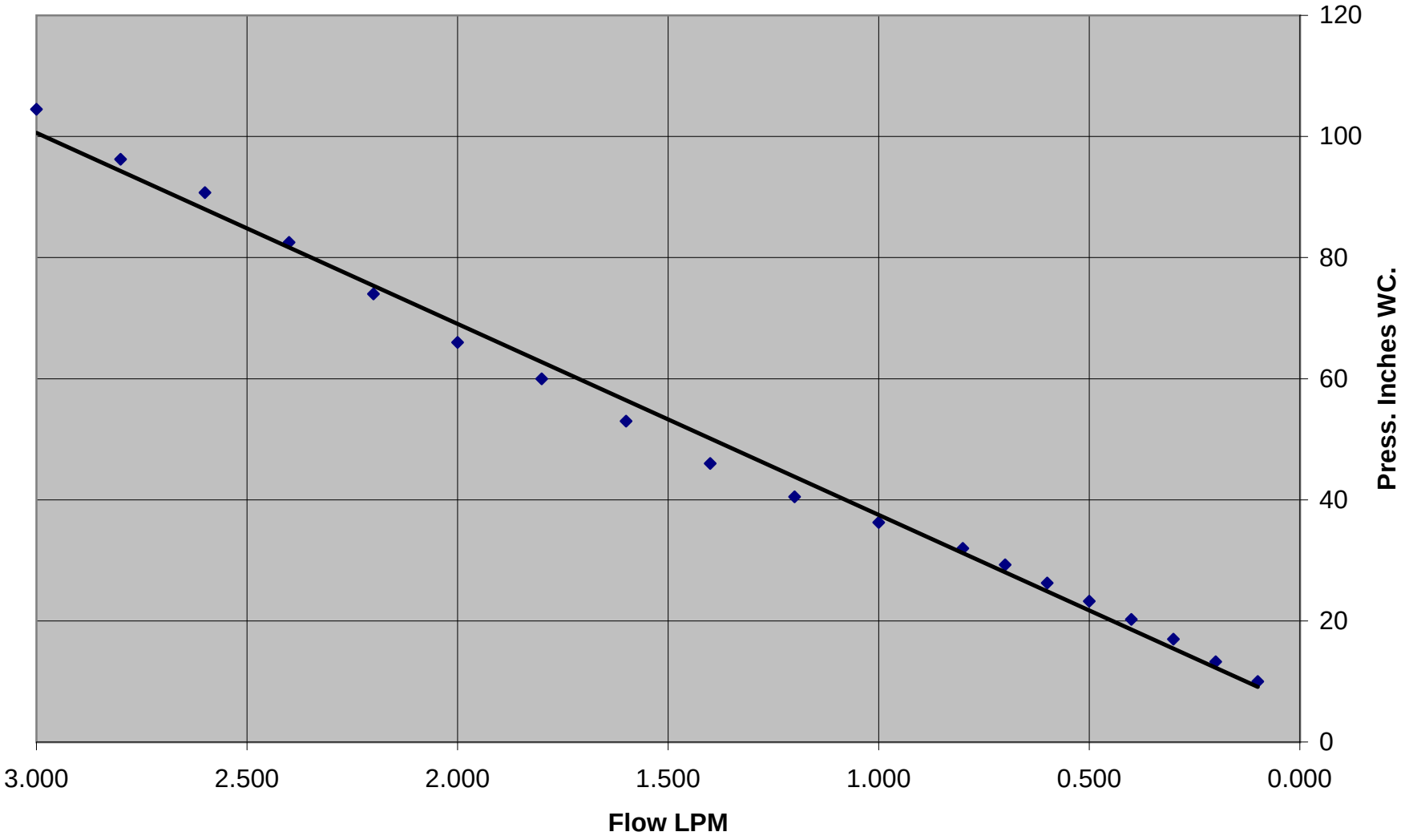
2.5x12 Start Up Pressures after 1 Hour Soak

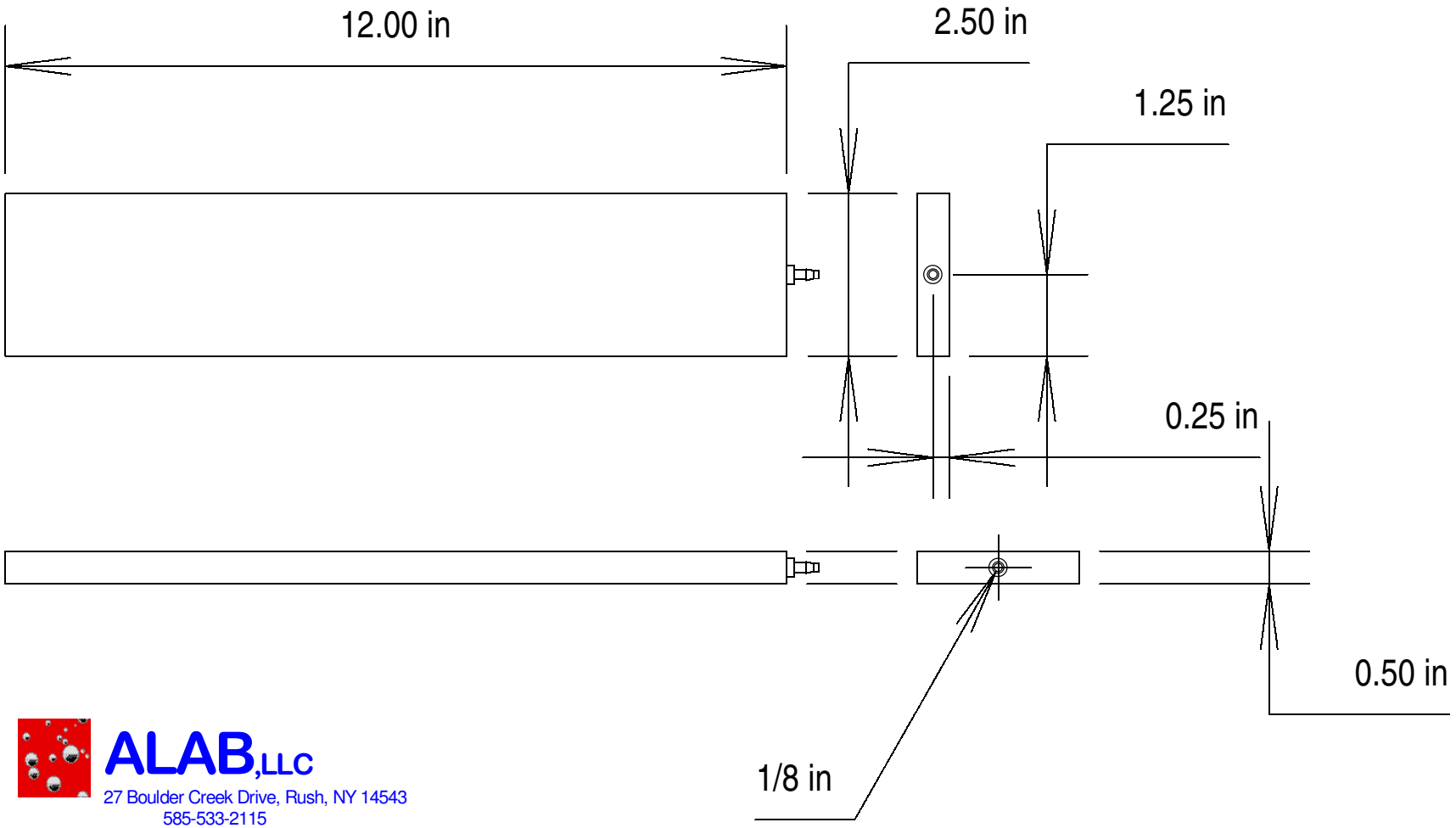


2.5x12
1 Hour Soak Turn Down from 3 LPM



Wetted Pressure Turndown from 4.5 LPM





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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
- 12x12s _____
- 12x12FRP _____
- 2.5x12 _____

Serial Number(s) _____
Serial number range may be used for multiple registrations

Invoice Number _____

Date Installed _____

FOLD HERE

Intended Use

Field of Use
- Aquaculture _____
- Wastewater _____
- Water Treatment _____
- Flotation _____
- Other _____

Liquid Into Which The Gas Is Diffused
- Water _____
- Salt Water _____
- Waste Water _____
- Industrial Process _____
- Other _____

Gas To Be Diffused
- Oxygen _____
- Air _____
- Other _____