

## Aeration / Oxygenation systems

With increasing stocking densities in ponds and tanks, extra oxygen has to be supplied to the water. The selection of the oxygenation system strongly depends on the situation and the amount of extra oxygen required. For pond aeration we can supply a wide range of surface aerators, diffused air systems, destratification systems or systems with combined effects.

*Paddlewheels*



*Porous hose (several types available also for oxygen)*

When aeration is insufficient, pure oxygen can be used. Pure oxygen can be added to the water with bubble diffusers, venturis or oxygen reactors. Due to the high costs of pure oxygen the efficiency of the oxygenation system is of great importance.

Aeration systems and oxygenation systems can also be used as back up systems in case of emergencies. Control of these systems can be done automatically with the OxyGuard oxygen measurement and control systems (see further in this catalogue).

*Oxygen reactor*



## Aerators

The Aire-O<sub>2</sub> aspirator aerator offers an economic aeration system for the aquaculture industry. The aerator injects air in a high velocity of bubbles with its propeller. The fine bubbles are injected below the surface and thus optimise the efficiency of the oxygen input. Water movement created by the aerator ensures optimal mixing of oxygen in the water and reduces stratification of the waterbody.

*Aire-O<sub>2</sub> injectors*



Models are available with 3 types of floats and various sizes of motors. Commonly used are 1, 2 and 3 HP motors (available in 50 or 60 Hz and all commonly used voltages). Larger models available 5 or 7 Hp.



*Complete mixing in a small intensive shrimp pond in South America*



*An underwater view of the Aire-O2 aerator's fine bubble oxygenation and mixing capabilities*

### Advantages of the Aire-O<sup>2</sup> aerator;

- easy to install
- complete unit with floats
- only one moving part (- no gear box required)
- adjustable mounting angles for shallow and deep water application
- premium quality motors
- Increased stocking densities and thus profits



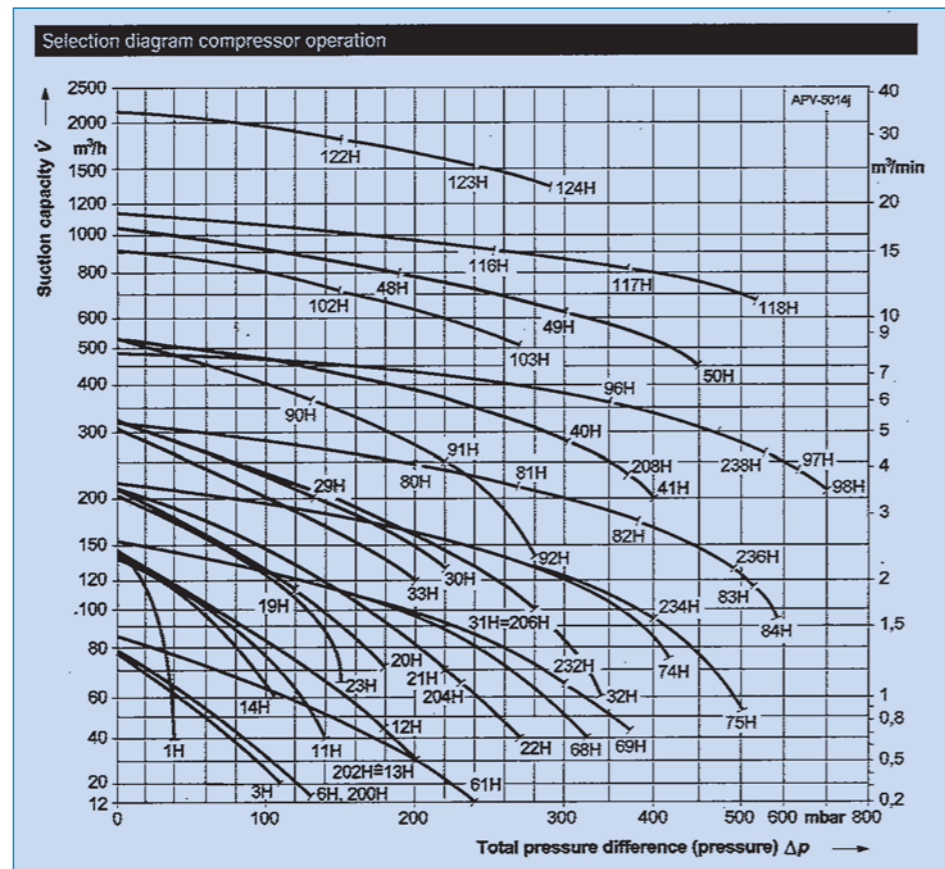
## Air blowers



Air blowers are used for the aeration of water with air stones, air hose or air lifts. Next to the supply of oxygen to the water, the air strips off excessive carbon dioxide and/or nitrogen gas. Aeration can also be used to de-stratify water columns or to keep particles or algae/rotifer/artemia cultures in suspension.

A wide range of blowers is available. A selection can be made with one of the diagrams where air output and pressure are given. To get the total required pressure, some extra pressure requirement for losses in pipings and resistance in outlets has to be added to the water depth. If in doubt please contact Catvis for advice.

### Selection diagrams:



## Aeration and oxygenation hose

### Oxygenation hose

Diameter: 14,2 mm outward / 8,8 mm inward  
 Bubbling starts at 0,05 Bar  
 Capacity (optimal): 2,8 m<sup>3</sup>/hr per meter hose, at 0.3 Bar  
 Max length in one piece: 10 m per oxygen inlet. Sold on full rolls of 200 m length only  
 Material: SBR rubber and Polyethylene  
 Temp : max approx 50 degrees C  
 Weight: approx 100 gr/m

### Aeration hose

Diameter: 25,4 mm outward / 12,7 mm inward  
 Oxygen transfer per meter hose: 0,061 (fresh water) - 0,151 (35 ppt salt) kg/hr  
 Breaking pressure : 5,5 Bar,  
 Pressure loss : < 0,03 Bar  
 Capacity (optimal): 2,2 m<sup>3</sup>/hr per meter hose  
 Max length in one piece: 3 meters per air-input. Sold on full rolls of 60 m length only

### Punctured Oxygenation hose

Diameter: 27 mm outward / 19 mm inward  
 Bubbling starts at: 0,25 Bar  
 Working pressure: 1 Bar.  
 Max pressure: 2 Bar  
 Material: Punctured EPDM rubber hose  
 Max length: 15 m per oxygen inlet. Sold on rolls of 40 m length only.  
 Weight: approx 350 gr/m



## Air diffusers

### Ceramic diffusers



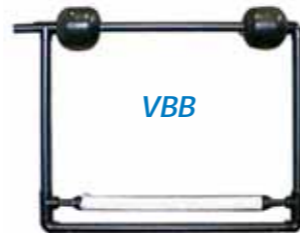
Ceramic bar distributors are available with central or side air inlet.

Type	Length (cm)	Capacity (m <sup>3</sup> /h)
BC 2.18	50	3 - 4
BC 2.50	113	9 - 11
BS 1.18	31	2 - 3
BS 1.50	63	4 - 5
BS 1.75	88	6 - 8

### Plastic diffusers

Bar diffusers in unbreakable plastic are also available in various lengths. The plastic material is relatively insensitive for clogging by algae or bacteria. If clogging does happen, the diffuser can be cleaned easily.

Plastic bar distributors can also be supplied complete with frame, weights and floats. Depending on the application, various diffusers can be supplied with bubble sizes ranging from very fine to medium size.



Length (cm)	Capacity (m <sup>3</sup> /h)
10	5 - 10
20	10 - 15
30	20 - 30
50	40 - 50
90	75 - 90
100	80 - 100



## Air / Oxygen diffusers



Ceramic diffusers are available as medium-pore air diffuser and fine-pore diffuser for ozone and pure oxygen. Typical bubble sizes are 1-3 mm and 0.5-2 mm respectively.

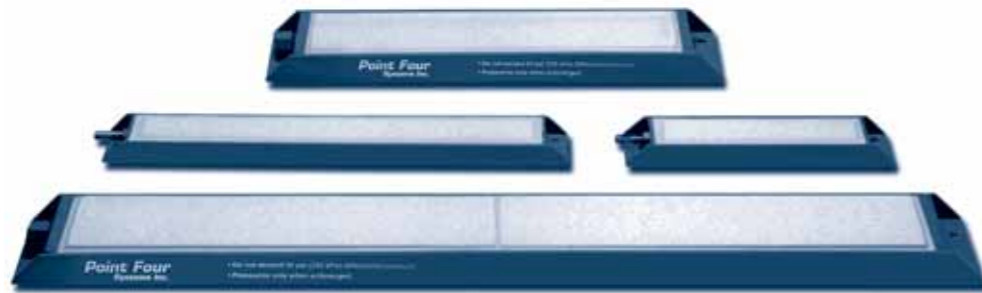
Both types can be supplied with the following characteristics:

Type	Dimensions (cm)	Capacity (L/min)
CAT 1	4 x 1.3 x 1.3	1.4
CAT 2	4 x 2 x 2	2.8
CAT 3	4 x 4 x 4	7.1
CAT 4	5 x 2.5 x 2.5	5.6
CAT 5	8 x 2.5 x 2.5	8.5
CAT 6	8 x 4 x 4	9.9
CAT 7	15 x 4 x 4	14.1
CAT 8	23 x 4 x 4	21.2
CAT 9	30 x 4 x 4	28.3
VP 13	13 x 13 x 3	20.0

VP 13 is a medium pore plastic diffuser, which ensures a very long lifetime. The VP 13 is self weighted and thus always ready to use.



## Oxygen diffusers



Point Four diffusers are a simple and cost effective way of dissolving gases such as oxygen or carbon dioxide in water.

The most efficient way to introduce the gas is as small bubbles - the smaller the bubbles the more efficient the absorption will be.

The Point Four diffuser produces a cloud of extremely fine bubbles, 100 to 500 microns, much finer than graphite or carborundum diffusers or porous hose. Because the diffuser is flat, bubbles do not coalesce as happens with cylindrical diffusers.

The Point Four diffuser uses a fine pore ceramic plate, which produces uniform bubbles across its entire surface. The ceramic is a clean and inert material.

Model	PMBD 75	MBD 100	MBD 300	MBD 600
Size in cm	19,5 x 7	37 x 4,5	39 x 8,3	70 x 8,3
Weight	0,45 kg	0,54 kg	1,2 kg	2,3 kg
Recommended flow	0,75 LPM	1,5 LPM	3 LPM	6 LPM
Maximum flow rate at 3,5 Bar	2,2 LPM	4,5 LPM	9 LPM	18 LPM

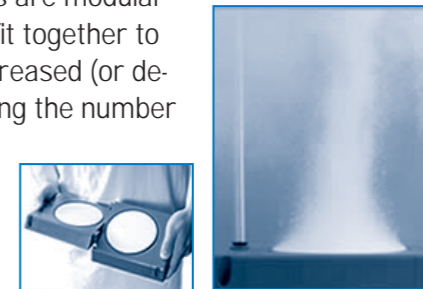
**Note 1:** Upon special request MBD 900 and MBD 1200 are also available.

Compared to other diffusers you will use less gas and require fewer diffusers to achieve the same result, e.g. in a 6 m deep reservoir an absorption efficiency (AE) of 80% can be expected. In a 1 m deep fish tank the AE will be around 40%.



### Flexible diffuser systems:

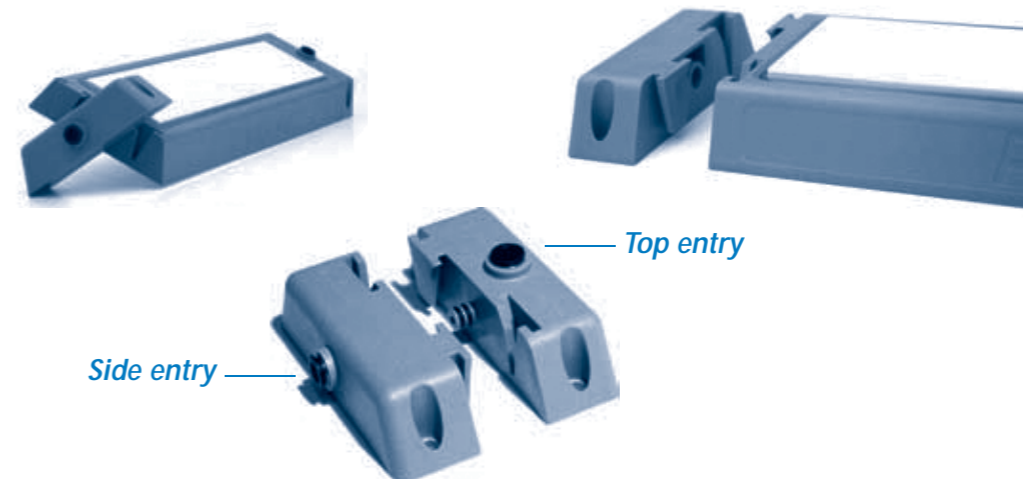
The Point Four Wedglock and Tracklock systems are modular systems of base unit diffusers and end sets that fit together to form a bank unit. Oxygenation capacity can be increased (or decreased) as your needs demand by simply changing the number of base-unit diffusers. This way a greater flexibility and minimal downtime are guaranteed.



*The Point Four Wedge Lock™ system.*

### Features and Benefits:

- Flexible and modular design
- Simple and quick set up without tools
- Made from rugged thermoplastic, so no corrosion and UV resistant
- Extreme fine bubbles (100- 500 micron) resulting in a high absorption efficiency
- Due to the flat shape reduced bubble coalescence
- Ceramic surface is an inert material and easy to clean



Model	Wedge lock	Track lock
Base unit (LxWxH in cm)	13,7 x 16,8 x 3,2	34,3 x 11,4 x 3,3
Single unit (assembled) (LxWxH in cm)	20,1 x 16,8 x 3,2	40,6 x 11,4 x 3,3
Triple unit assembled (LxWxH in cm)	47,5 x 16,8 x 3,2	109,2 x 11,4 x 3,3
Max number in one assembly	8	4
Connection	8 mm OD rigid tubing (nylon) 6-8 mm ID with hose nipple	

## Oxygen reactors

To dissolve large amounts of oxygen in the waterflow, oxygen reactors are used all over the world. Pure oxygen is supplied under pressure and thus dissolves completely in the water.

Saturations up to 500 % can be reached with a high efficiency of the supplied oxygen (95-100 %).

Oxygen reactors can be delivered in stainless steel 304 or 316L or polyester. Sizing and pump requirements depend on waterflow and on the required amount of oxygen to be dissolved. For very large flows it is often more economical to supersaturate only a partial waterflow with oxygen and then mix this water with the main flow before entering the fishtank. For proper advice please contact Catvis.

- **Reliable & efficient (95-100 %) input of pure oxygen in your system water.**
- **All made in SS 304, SS 316 or polyester.**
- **Available in several capacities.**
- **More oxygen = more feed = better growth.**

*Polyester oxygen reactors in high density fish farm system.*



## Water quality measurement

Waterquality measurement is the key issue for proper water management. OxyGuard has developed a series of waterquality meters which can either be used stationary, for continuous measurement or portable, for field measurements.

### OxyGuard Portable meters

The OxyGuard series of portable oxygen meters are the standard for in field or on the spot oxygen measurement. OxyGuard know-how, reliability and ease of use are put together in a new design. Calibration is simply made in air. The meter is stored dry. Just switch it on, adjust the calibration (which takes a few seconds) when needed and the meter is ready for the rest of the day.



*OxyGuard Polaris 2 - with datalogging*

### OxyGuard models available:

- **Polaris** : oxygen and temperature measurement, compensation for salinity and barometric pressure..
- **Polaris 2**: oxygen and temperature measurement, compensation for salinity, barometric pressure, time and data storage.

### OxyGuard portable meters for other parameters.

- **Handy pH**: measurement of pH in the water.
- **Handy Salinity**: measurement of salinity of the water (measures temperature and conductivity from which salinity is calculated).
- **Handy TGP**: measures the total dissolved gas pressure, temperature and oxygen in water.
- **Portable CO2 meter**: measures gaseous CO2 in water.

All OxyGuard meters are compensated for temperature.