

**GasBuster®** is a new and highly efficient CO<sub>2</sub> aerator. It has been designed with counter flow aeration; air and water runs the opposite way in the aeration chamber and it is possible to control the quantity of air relative to water. A patented cleaning system safeguards that the aeration medium in the unit always is clean. Therefore, **GasBuster®** always achieves constantly high cleaning efficiency.

High cleaning efficiency relative to CO<sub>2</sub> is more important than one should believe if the goal is to achieve high production capacity in fish farming.

As an illustrative example, you will, in a tank with a volume of 500 m<sup>3</sup>, be able to introduce about 100 000 more 100 gram fish at 12°C if the cleaning efficiency of the CO<sub>2</sub> aerator is increased from 50% to 75%.

This means that in practice, that by investing in a highly efficient aerator, you may increase the capacity in the facility quite a lot – thus a profitable investment!

When you plan increased capacity in the facility by means of CO<sub>2</sub> aeration, it is of vital importance the water treatment technology works with uniform efficiency all the time.

If the cleaning effect is reduced as a consequence of fouling for example due to high temperatures, you will lose capacity when you need it the most. A built-in, patented cleaning system in **GasBuster®** safeguards that the aerator always is equally efficient. This is the most important property of this CO<sub>2</sub> aerator.

Time consuming manual cleaning work becomes unnecessary – **GasBuster®** is cleaned automatically every day!

We offer assistance with solutions for installation, including dimensioning and design of piping to/from **GasBuster®** and into the tank in order to achieve good water flow (hydraulic) in the tank. The correct flow rate and flow through are important assumptions in order to achieve good water environment in fish farming tanks.



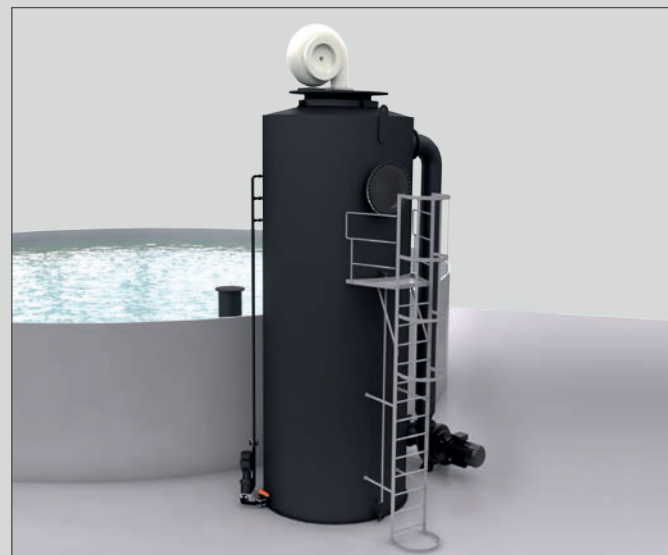
Each **GasBuster®** is equipped with a process control system placed in a control cabinet for installation outdoors. In the front of the control cabinet, there is an operator panel for easy control. A PLC governs and checks the water pumps, the water level, the fan and the cleaning system. We offer technology for remote connection to the aerator's control cabinet. This provides immediate assistance in case of operation disturbances, and SMS alarm transmitter as well as the opportunity of installing 24 hour online service. The control system has been FAT tested and checked before delivery.

**GasBuster®** is made from polyethylene (PE) and is therefore robust, has a long service life as well as being resistant to chemicals and corrosion. The unit is easy to clean and to disinfect.

All the **GasBuster®** models are tested with water and are quality assured before dispatch.

## GasBuster® is delivered in different models

The pictures below show two different models of **GasBuster®**, high and low edition. With the high edition, the water is pumped from the tank into the top of the aerator chamber and flows back to the tank by means of gravity. In the low edition, the water is added by means of gravity from the fish farming tank and is then pumped back after treatment.



The models are set up with double inlet for sharing between two tanks outdoors.

## GasBuster® is delivered with:

- High quality water treatment unit made from PE
- Low pressure fan with high aeration capacity
- Aeration medium provides efficient removal of CO<sub>2</sub>
- Built-in cleaning system with high pressure pump
- Pressure sensor for accurate water control
- Level pipe for visual water level check
- Manhole/inspection window for visual control of medium/service
- Drain valve
- Control system (PLC) for automatic operation

## In addition, GasBuster® may be delivered with:

- Water pumps and valves
- Ladder and work platform in galvanized steel (IPE80)
- System for addition of oxygen and removal of nitrogen
- Remote connection
- SMS alarm system

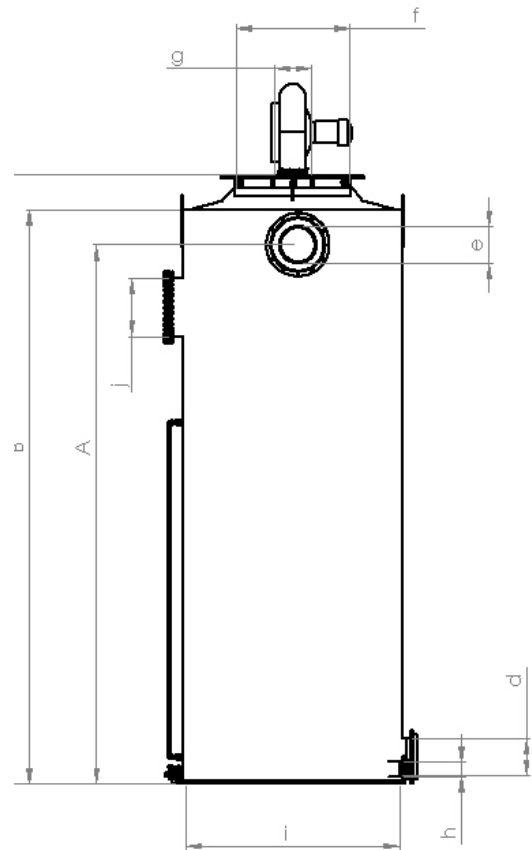
## Scientific documentation

Researcher Asbjørn Bergheim at IRIS has been in charge of the testing of the prototype at Marine Harvest's facility at Kvingo.

He says: "The results are remarkable. We measured 80% reduction from 10 mg CO<sub>2</sub> per litre all through the testing period."

Read more:

[www.alvestadmarin.com/aktuelt/arti-el-kyst.no](http://www.alvestadmarin.com/aktuelt/arti-el-kyst.no)  
[www.alvestadmarin.com/aktuelt/artikel-norskfiskeoppdrett](http://www.alvestadmarin.com/aktuelt/artikel-norskfiskeoppdrett)  
[www.alvestadmarin.com/dokumentasjon-lufter](http://www.alvestadmarin.com/dokumentasjon-lufter)



A	Height inlet
B	Height division ring
C	Total height
Ød	Diameter outlet
Øe	Diameter inlet
Øf	Diameter air outlet
Øg	Diameter manhole
Øh	Diameter oxygen inlet
Øi	Diameter main tank

## INVESTMENT AND PROFITABILITY

### INVESTMENT IN HIGHLY EFFICIENT CO<sub>2</sub> AERATORS IS HIGHLY PROFITABLE

Yngve Ulgenes, January 2014

We have carried out an assessment of the economic consequences of investing in CO<sub>2</sub> aerators with high cleaning effect compared to aerators with lower cleaning effect.

*The assessment shows that in a 350 m<sup>3</sup> tank, an increase in the cleaning effect from 50 – 60% up to 75 – 80% may provide a potential growth in turnover of about 1 million NOK per year provided certain assumptions. This assumes that the technology provides stable, high effect.*

Investment in efficient and stable aerator technology is the fastest way to increase the production capacity in a smolt facility. Even if the assessment in this memo mentions salmon particularly, the assessment will also be valid for salmonides in general.

Model		Capacity m <sup>3</sup> /min	Water inlet height A mm	Tank height B mm	Overall height C mm	Water outlet diam. Ød mm	Water inlet diam. Øe mm	Air outlet diam. Øf mm	Air inlet diam. Øg mm	Oxygen nozzle Øh mm	Tank inner diam. Øi mm	Manhole diam. Øj mm
Basic	2.5-01	2,5	2700	3000	3400	250	315	600	250	-	1200	400
Total	2.5-02	2,5	3100	3400	3800	250	315	600	250	160	1200	400
	2.5-03	2,5	5700	6000	6300	315	225	600	250	160	1200	400
Basic	5-01	5	2700	3000	3400	315	355	800	315	-	1600	630
Total	5-02	5	3100	3400	3800	315	355	800	315	160	1600	630
	5-03	5	5700	6000	6300	355	250	800	315	160	1600	630
Basic	7.5-01	7,5	3200	3600	3950	355	400	1000	355	-	1960	630
Total	7.5-02	7,5	3800	4200	4550	355	400	1000	355	160	1960	630
	7.5-03	7,5	5700	6100	6450	400	315	1000	355	160	1960	630
Basic	10-01	10	3200	3700	4050	400	450	1200	400	-	2300	630
Basic	10-01 S	10	3600	4100	4450	400	450	1200	400	-	2300	630
Total	10-02	10	4000	4500	4850	400	450	1200	400	160	2300	630
	10-03	10	5700	6150	6500	450	355	1200	400	160	2300	630
Basic	12.5-01	12,5	3200	3700	4050	450	500	1300	450	-	2600	630
Basic	12.5-01 S	12,5	3600	4100	4450	450	500	1300	450	-	2600	630
Total	12.5-02	12,5	3800	4300	4650	450	500	1300	450	160	2600	630
Total	12.5-03	12,5	5800	6300	6700	450	500	1300	450	160	2600	630
Basic	15-01	15	3400	3900	4300	500	560	1400	500	-	2800	630
Basic	15-01 S	15	3800	4300	4700	500	560	1400	500	-	2800	630
Total	15-02	15	4200	4700	5100	500	560	1400	500	160	2800	630
Total	15-03	15	5800	6300	6700	500	560	1400	500	160	2800	630
Basic	17.5-01	17,5	3400	4000	4500	560	630	1600	560	-	3000	630
Basic	17.5-01 S	17,5	4000	4600	5100	560	630	1600	560	-	3000	630
Total	17.5-02	17,5	4500	5100	5600	560	630	1600	560	160	3000	630
Total	17.5-03	17,5	5900	6400	6800	560	630	1600	560	160	3000	630
Basic	20-01	20	3500	4100	4600	630	710	1800	630	-	3200	630
Basic	20-01 S	20	4100	4700	5200	630	710	1800	630	-	3200	630
Total	20-02	20	4700	5300	5800	630	710	1800	630	160	3200	630
Total	20-03	20	6000	6600	7100	630	630	1800	630	160	3200	630

