Professional Chalk-Reactor
for producing soluble calcium and hydrogen carbonate

AquaCare GmbH & Co. KG
Am Wiesenbusch 11 - D-45966 Gladbeck - Germany
☎ +49 - 20 43 - 37 57 58-0 • 🖷: +49 - 20 43 – 37 57 58-90
www.aquacare.de • e-mail: info@aquacare.de

Turbo Chalk Reactor size 8 with professional control (PLC)

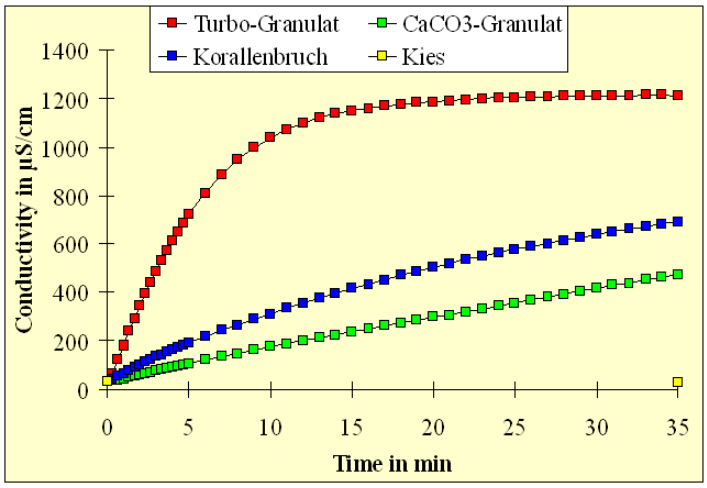
The *Turbo* Chalk Reactor

The AquaCare *Turbo* Chalk Reactor is a further development of the traditional chalk reactors. The effectiveness was drastically increased. Due to the very high water flow inside the system any channels will uprise. If channels would occur the flow is lowering and the dissolving of the material will drastically decrease. The AquaCare reactor uses a special gravel, that have a very high dissolving capacity (see graphic) compared to other materials like corals gravels or calcite rubbles. The CO_2 supply is made without a pH-probe. The built in AquaCare control *BasiTech* is very reliable and you do not need to calibrate a probe or replace it after 1 to 2 years – with size 8 or larger (smalle sizes on request) a professional mini-PLC is installed. The CO_2 input is visible in the CO_2 tube and in a pass meter; you do not need an additional bubble counter that has to be filled regularly. In an air-driven neutralization tube the pH is raised up to pH 7.0 depending on the operation parameter. Compared to other conventional CO_2 reactors it implies that the AquaCare system contains up to 80% less free CO_2 in the outlet water. Consequently the risk of a green algae trouble is extremely reduced. The air input is shown with a flow meter. The water supply should be made with a strong pump with minimum 10 meters pressure or with the auxiliary pressure outlet of the AquaCare skimmer. Together with a pressure relief system and the water inlet valve with flow meter the internal pressure of the *Turbo* Chalk Reactor is established. The high internal pressure ensures extremely high dissolving rates. In the last step of the *Turbo* Chalk Reactor the calcium and hydrogen carbonate enriched and neutralized water flows through a particle filter. Sediments and too small become granules will be rejected. In the sediment step some phosphate is adsorbed by chemo-sorption, too. By the way the calcite bed must never be changed. You only fill up the tube from time to time.

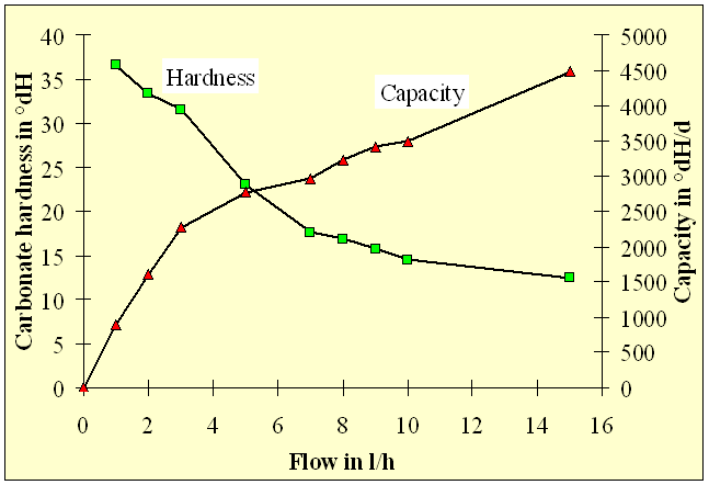
The *Turbo* Chalk Reactor

Chalk dissolving experiment: different chalk containing materials were tested in carbon dioxide enriched pure water. As a control quartz gravel ("Kies") is used. In the graphic you can see the conductivity against the time ("Zeit"). The first linear ascent is calculated as increase of calcium concentration and summarized in the table:

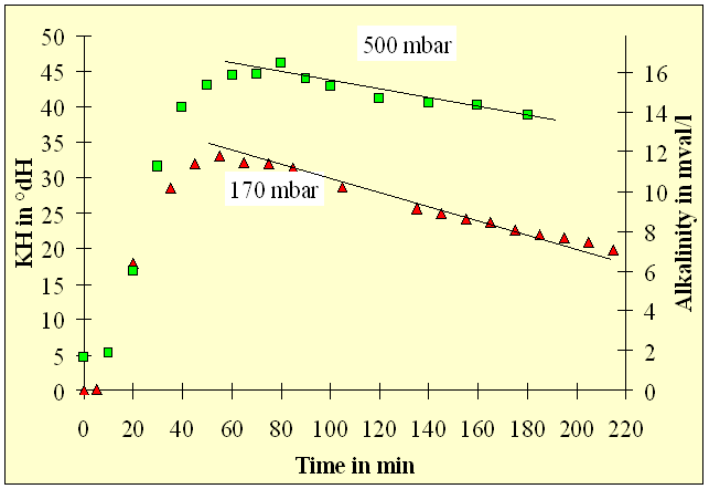
Material	**Calcium ascent in mg/l·h**
Quartz gravel (control)	0
Calcium carbonate granules	4
Coral gravel	7
***Turbo* granules**	**41**



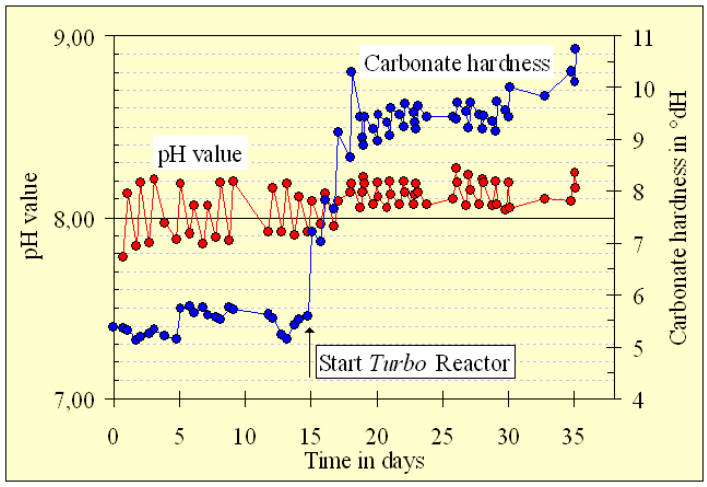
Hardness and **efficiency** depending on water inlet flow. Measured at *Turbo* Chalk Reactor size 1 (lab scale).



Course of the produced **carbonate hardness** (alkalinity) against the **time** in *Turbo* Chalk Reactor size 7 (technical size) at 170 and 500 mbar internal reactor pressure.



Course of pH and carbonate hardness in a 400 litres aquarium against the time in days;
arrow: start of the *Turbo* Chalk Reactor size 1 (lab scale).
Before calcium and carbonate hardness (alkalinity) were guaranteed with Aqua-Care solution "Calcium-plus" and "Carbonate hardness-plus"



Technical Data of AquaCare *Turbo* Chalk Reactor

	Size 6	Size 7	Size 8
Order number	311-006	311-007	311-008
Maximum aquarium size in litres (with prevailing hard corals)	25,000	50,000	100,000
Dimensions (W×H×D) in cm	200 × 100 × 65	200 × 150 × 65	280 × 170 × 65
Volume of granules in litres	13	27	77
pH-value of outlet water	depending on operation pressure		
Maximum daily efficiency in hardness × litres	250,000	500,000	1,000,000
Diameter main tube in mm	160	200	315
Material of main tube	PVC transparent		
Material of tubing	PVC		
Build in pump	MD-40RM	MD-55R-5M	MD-100R-5M
Power consumption (230 V, 50 Hz) incl. air pump	0.15 kW	0.3 kW	0.5 kW
Connectors inlet / outlet	PVC 20 / 40	PVC 20 / 50	PVC 25 / 63
Optimum inlet flow in litres per hour	250 (1 bar)	500 (1 bar)	1000 (1 bar)
Required air input in litres per hour	2,000	4,000	7,000
Required CO_2 supply	CO_2 pressure tank with pressure relief valve and needle valve		
Turbo granules supplied in kg	30	30	60
Empty weight / operation weight / transport weight in kg	80 / 120 / 110	160 / 240 / 220	250 / 550 / 300

Larger systems on request

Available options: – air supply – water supply – electronically flow meters for water and air – level control sediment filter

Professional control (PLC)

The *Turbo* Chalk Reactors sizes 6 to 8 are equipped with a mini PLC. In addition to all necessary electrical components, the display of the PLC shows the current status in full text. The following parameters can be set or monitored:

- Water inlet control (limit contact),
- supply air control (limit contact),
- CO_2 deficiency detection,
- Full text display of status and faults,
- Programming of running time in %,
- programming of start time
- normal and eco mode (CO_2 saving),
- potential-free collective fault contact,
- Input for pH value (emergency shutdown),
- Input for KH (alkalinity) value (demand control), can also be used as external start-stop signal.

Alternatively we can offer you a visualized Siemens PLC.