

# Professional Chalk-Reactor for producing soluble calcium and hydrogen carbonate



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*Turbo Chalk Reactor size 8 with professional control (PLC)*

## The *Turbo* Chalk Reactor

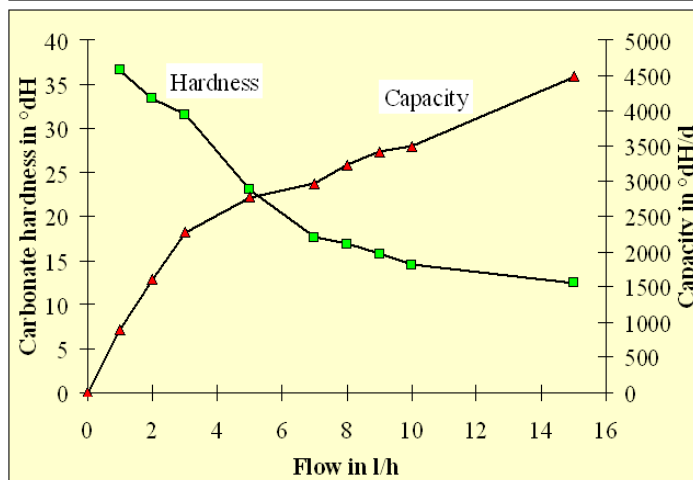
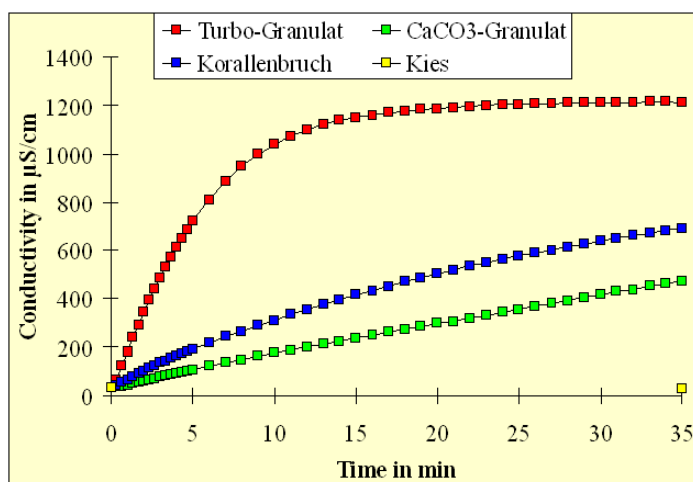
The AquaCare *Turbo* Chalk Reactor is a further development of the traditional chalk reactors. The effectiveness was drastically increased. Due to the very high water flow inside the system any channels will uprise. If channels would occur the flow is lowering and the dissolving of the material will 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<sub>2</sub> 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<sub>2</sub> input is visible in the CO<sub>2</sub> 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<sub>2</sub> reactors it implies that the AquaCare system contains up to 80% less free CO<sub>2</sub> 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

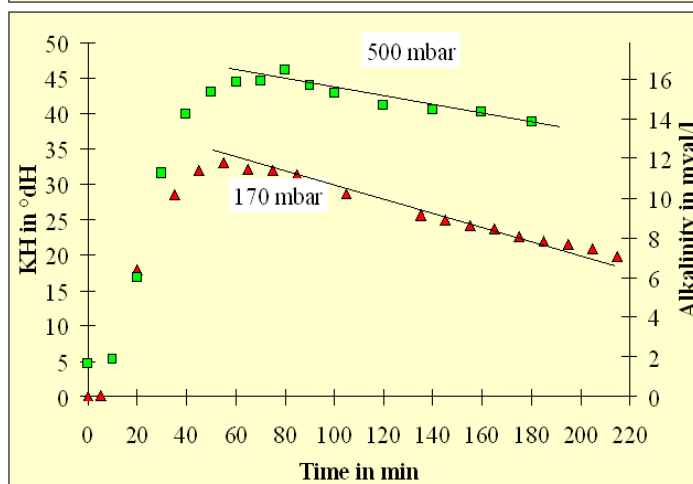
**Chalk dissolving experiment:** different chalk containing materials were tested in carbon dioxide enriched pure water. As a control quartz gravel (“Kies”) is used. In the graphic you can see the conductivity against the time (“Zeit”). The first linear ascent is calculated as increase of calcium concentration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

| Material                   | Calcium ascent<br>in mg/l·h |
|----------------------------|-----------------------------|
| Quartz gravel (control)    | 0                           |
| Calcium carbonate granules | 4                           |
| Coral gravel               | 7                           |
| <b>Turbo granules</b>      | <b>41</b>                   |

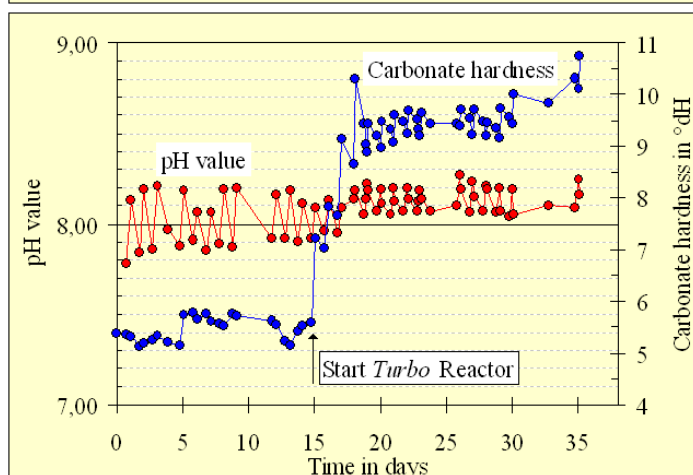
**Hardness and efficiency** depending on water inlet flow. Measured at *Turbo* Chalk Reactor size 1 (lab scale).



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 m <sup>3</sup>                  |   |                 |                 |
| - with predominantly stony corals                        | 25  | 50              | 100             |
| - normal reef tank                                       | 250   | 500             | 1000            |
| - fish system with artificial corals                     | 500   | 1000            | 2000            |
| Dimensions (W×H×D) in cm                                 | 200 × 100 × 55  | 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 <sub>2</sub> supply                          | CO <sub>2</sub> pressure tank with pressure relief valve and needle valve |                 |                 |
| <i>Turbo</i> 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<sub>2</sub> deficiency detection,
- Full text display of status and faults,
- Programming of running time in %,
- programming of start time
- normal and eco mode (CO<sub>2</sub> 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.