



TIDE CHAMBERS

AQUABIOTECH INC

Coaticook (Qc)

CANADA J1A 2S5

Tel: (819) 849-4440

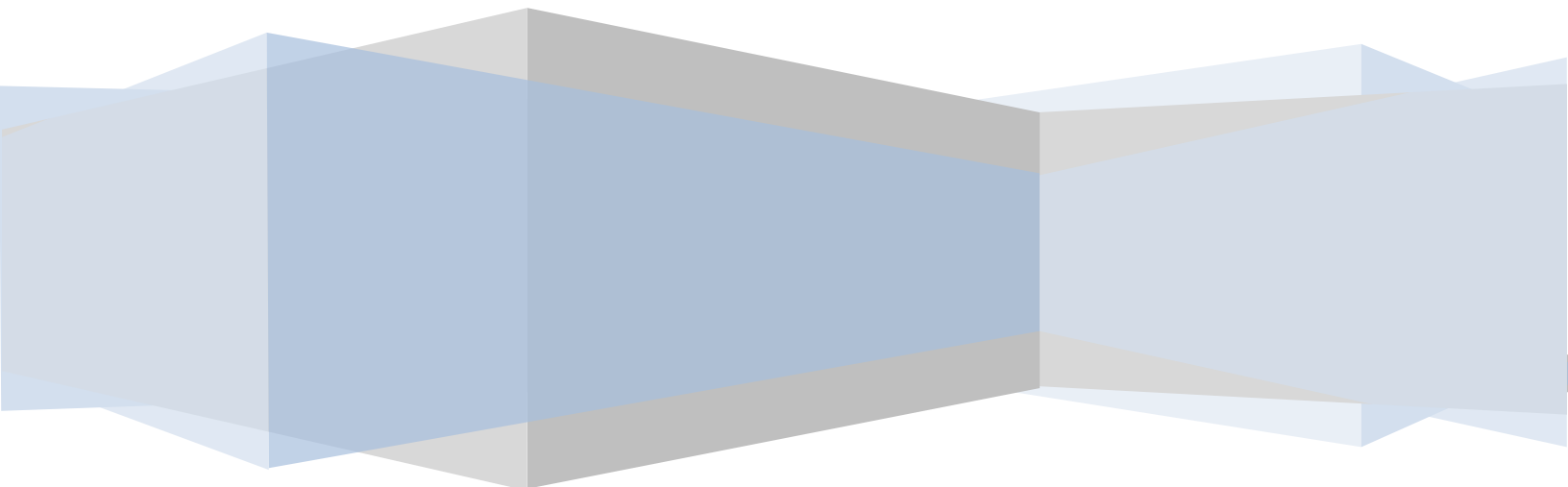
Toll Free: (888) 933-0303

(CDN)

hdrouin@aquabiotech.ca

www.aquabiolab.ca

*Aquabiotech Inc. custom-designs life support instruments for doing research
in accurately controlled environments*



TIDE CHAMBER WITH SINUSOIDAL VARIATIONS OF WATER LEVEL



This instrument allows the adjustment of all the characteristics of natural tides: low water, high water, the duration of flood or ebb, and more. With its wide range of water temperature ($2-30^{\circ}\text{C} \pm 0.3^{\circ}\text{C}$), it is designed to accommodate burrowing and non-burrowing animals. Up to 10 cm (4") of sediments can be added.

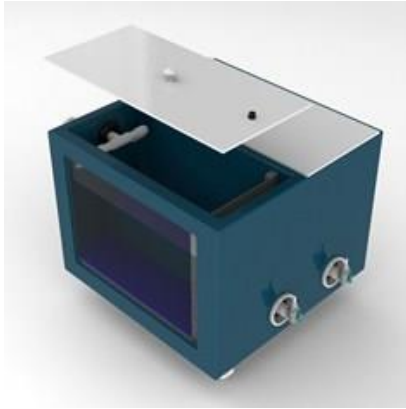


Illustration of Tide Chamber.

HOW IS IT CONSTRUCTED?

- An aquarium is divided into two sections:
 - The intertidal chamber is located at the front and hosts intertidal organisms.
 - The rear section stores excess water at low tides. The water level probe sits, undisturbed, within a separate portion of the intertidal chamber.
- It is design to operate in closed circuit operation, but the level of water renewal is adjustable (5-100% v/v per day).
- An oversized water REcycling with bio-filtration (REBF) system (industrial grade) maintains the water quality levelled for long-term tests. The process comprises nitrification through a pre-activated biofilter, filtration to 20 µm through a cartridge, micro-filtration with activated carbon and neutralization of acidity through a porous calcium substrate. An aeration stone is inserted into the lid for extra ventilation (if required).
- Insulated (1" expanded foam covered with ABS), the aquarium comes with a quiet water chilling/heating system for wide range of water temperature (2-30 ° C ± 0.3 °C).
- Legs are adjustable for leveling the unit.
- The unit rests on a corrosion and mould resistant fiberglass and plastic stand. The only metal parts (edges) are covered with plastic coating. Inert and easy to clean the stand is NSA-approved for direct contact with food and does not leach any chemical, thanks to the unique Microban® protection an antibacterial & mould resistant built-in agent.



HOW DO WE OPERATE THE TIDE CHAMBER?

- For a given experiment, the user must enter the following specifications in the Tide Monitron:
 - Height of low water (0-32 cm).
 - Height of high water (0-32 cm).
 - Duration of flood or ebb (minimum of 4 hours).
 - The number of consecutive tides.
 - Depth of the benthic substrate (0-10 cm).
 - Renewal rate of fresh seawater (5-100% of total water volume per day).
 - Water temperature set point (entered directly on the chilling system).

- A variable and reversible-flow peristaltic pump (0-10 volts) will transfer water from one reservoir to the next, creating a sinusoidal flux, as it occurs in the field. A precision in water level of ± 3 mm is normally obtained.

- As the water level rises or falls gradually within the intertidal chamber, this body of water is not stagnant. Five hourly exchanges of recycled/filtered water create a gentle stream of water. Proportional to the height of the tide, this flow decreases automatically with the water level, preventing the leaching of sediments at low tide.



DIMENSIONS AND ELECTRICAL SPECIFICATIONS

Intertidal section hosting the animals	
Volume:	37 liters (9.9 gal).
Dimensions (int.)	48.5 cm front x 24.0 cm front deep x 32.0 cm H.
Total intertidal area with probe section	
Volume:	42 L (11 gal).
Dimensions (int.)	48.5 cm front x 24.0 cm front deep x 32.0 cm H.
Frame	4'x24". Height is variable with the number of units (up to two units per rack)
Pumps (4)	24 VDC
Water chiller (water heater incorporated)	1/3HP, 120V/60Hz, or 220V/50Hz, CE certified. Compressor only is cUL and thermally protected.
Tide-Monitron	24VDC

PHOTOPERIOD CONTROL

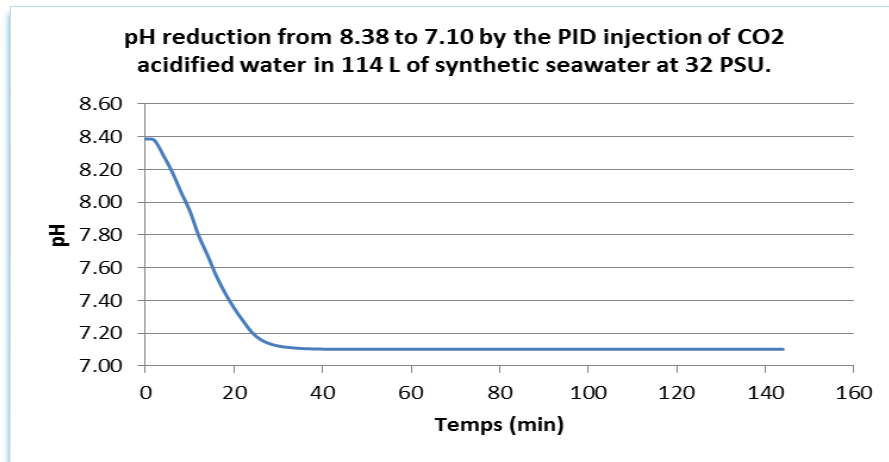
Light emitting diodes can be installed in option above each Tide chamber. The photoperiod cycles are controlled by the Tide Monitron, featuring:

- **LIGHT DIMMING** The Tide-Monitron controls each VDC light circuit, modulating light intensity above the tidal chamber. Sun rise and sun set are simulated, creating a more natural environment. The gentle light ramping generated significantly reduces light stress created by the sudden turned on/off of lights.
- **ASTRAL CYCLE** Fixed L/D cycles or natural circadian rhythms can be created with the Tide Monitron. Therefore, for any geographical position (longitude, latitude) and date you enter, a natural photoperiod is created with increasing day length in spring, for instance. Photoperiod cycles of any part of the world can be simulated.

CONTROL OF pH

Optional pH control is achieved through the injection of CO₂ acidified water. CO₂ gas is supplied by client. The assembly which is installed and pre-tested includes: a CO₂ bubbling tank , pump for CO₂-saturated water with housing, HACH pH probe with transmitter, with piping and valves.

Result from factory tests : With the injection of the CO₂-acidified seawater pH went from 8.38 to 7.1 in 30 minutes.



- The volume of acidified seawater injected was 3.8 + 0.5 liters.
- The final pH obtained was 7.1023 + 0.0003 (average of the data collected for the period starting on minute 40 through 144).

OPTIONS

- Two chambers in a rack (self-contained with water filtration systems, chillers and tide control)

Note: for illustration only. Set-up is somewhat different.



- On wheels in seawater resistant plastic.
Note: the floor must be perfectly levelled.
- Maintenance kit with spare parts & supplies for tide simulator : activated carbon – one refill; additional coral buffer (refill); 1 extra cartridge, fuses...
- Photoperiod simulation with a string of light emitting diodes (LED) above the Tide chamber, and controlled by the Tide-Monitron. Includes:
- pH control through the injection of CO₂ acidified water.
Includes: CO₂ bubbling tank , pump for CO₂-saturated water with housing, HACH pH probe with transmitter. Installation, quality tests.