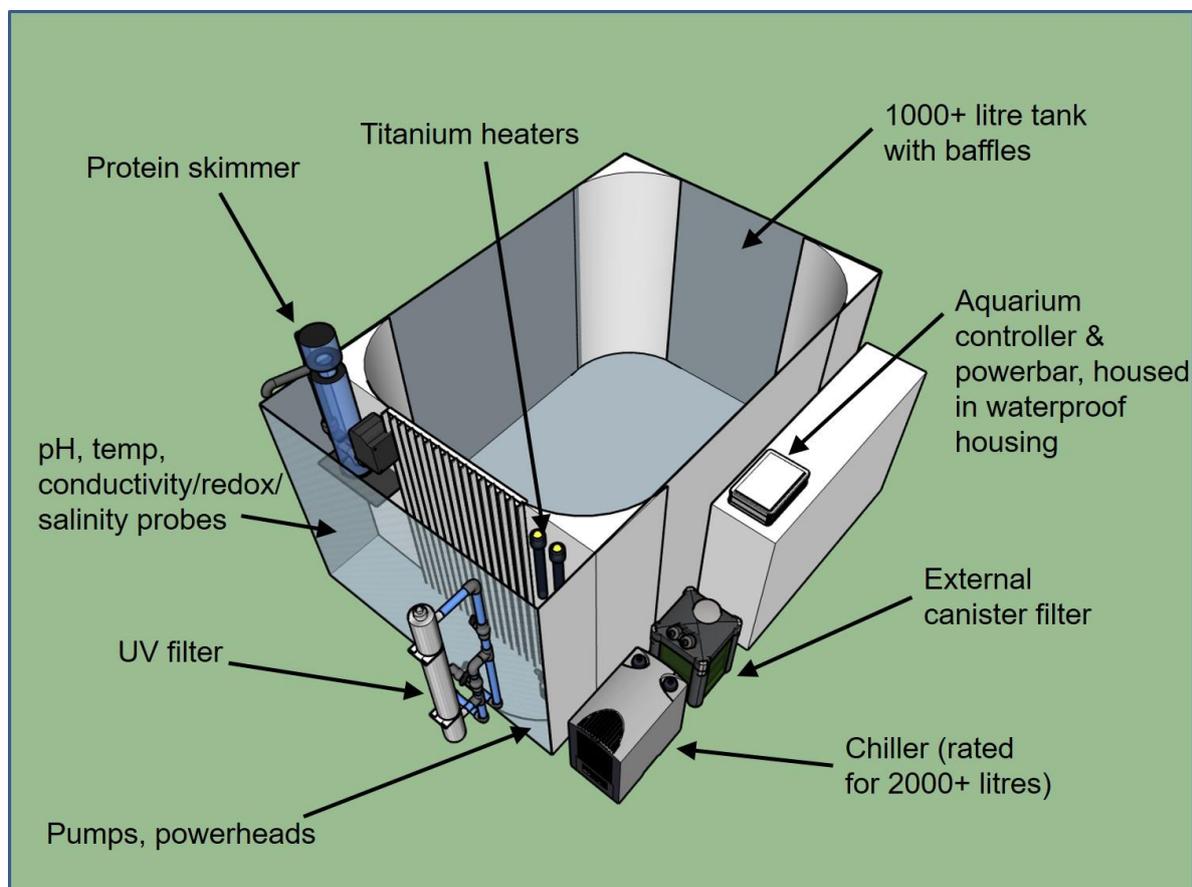


FAQ mesocosm equipment

General questions

Q: What is the intended purpose for the tanks/systems?

A: These tanks will be used to support the research carried out in the MBA aquarium – projects could range from aquaculture of seaweed to breeding sharks. Our main aims are to have 12 replicate (identical) 1000 litre capacity tanks each with their own dedicated filtration, heating and cooling equipment. We also want to move away from manual systems and use computer controllers (such as GHX profilux) which make use of probes to measure water quality (starting with pH, temp, redox, conductivity, salinity but expandable to include turbidity, oxygen etc) and control water quality by means of switches, pumps and solenoid valves. We want the systems to be more or less self-operating with the computer controllers maintaining salinity and water changes with the ability to hook up calcium reactors and gasses (Co2, nitrogen, oxygen) for future studies as and when required.



Q: Can you provide any information about the existing power supply to the area and some photographs and dimensions of the area where the tanks will be installed?

A: The room is supplied with mains electric and several IP45 rated socket points around the room and on the ceiling. If further power points are required these can be installed.

Q: What are you housing? Any considerations for escapees e.g. octopus / jumping fish etc

A: We will be housing a large variety of organisms - if required we will manufacture lids at a later date – they are not required in the first instance.

Q: What type of stocking? e.g. sensitive invertebrates, highly stocked fish only.

A: Potentially sensitive species, unlikely to ever be high stocking density.

Q: Do you know target temperature ranges?

5°C (during winter when outside temps are below 15°C) to 30°C

Q: Can we discuss the lots over the phone?

A: Due to the tendering process all questions and discussion must be conducted via email. Questions will be (anonymously) added to the FAQ.

Lot 1

Q: How many tanks are you looking for?

A: We are looking for 12 tanks – with a minimum operational capacity of 1000l and maximum operating capacity of 1400l. Water level in the tank will likely be 10-15cm lower than the top of the tank itself so the dimensions of supplied tanks will likely need larger than 1000 litres.

Q: Do you have a preference of tank material? e.g. all glass, fibreglass coated panel with front viewing window, all fibreglass with no window?

A: Plastic or fibreglass is preferable, opaque, for preference light grey but other colours would be suitable. No window is required.

Q: Do you require lids/condensation screen or open top on the tanks?

A: Open top

Q: What dimensions would you like these tanks to be? Shape?

A: Rectangular tanks are required – one end will be sectioned off to house the aquarium equipment (pumps, protein skimmer, probes, heaters) and this will result in the operating area of the tank being close to square which is desirable.

Q: Do you require steel frame to stand these tanks on or will they be placed on an existing frame / on the floor?

A: Tanks will be placed directly on the floor (which is designed to copy with the heavy loads of these systems).

Q: Are tanks to be drilled for filtration pipework? Any preference over type of overflow / return? e.g. weir with herbie / durso pipework?

A: Tanks will be drilled for return drains however this is something that will be achieved in house by our engineer or the company contracted to install the tanks.

Q: Will the tanks have a separate sump tank?

A: No

Lot 2

Q: How do you intend to modify water quality via controllers?

A: The aquarium controllers in mind (for example GHLprofilux controllers) are designed to modify water quality through the control of pumps, switches and valves. They will be connected to the water quality equipment (from lot 3), pumps from freshwater top up tanks and solenoid valves from our main reservoir seawater. In future we may use solenoid valves to control gasses such as CO₂ and O₂ or other aquarium equipment, dosers etc. The aquarium controllers should monitor water conditions in the tanks by means of the probes/electrodes and control equipment by means of powerhubs/powerbars.

Q: What float switch functions do you require? i.e. turn off return pump at low level?

A: Float switches/optical water sensors should (via the computer controller) operate the pump from the freshwater supply tanks and the solenoid valve to our recirculating piped seawater in order to maintain water levels and salinity.

Q: Can you expand on level of monitoring and control required?

A: Initially we wish to continually monitor temperature, salinity, pH, redox and conductivity. We wish to control temperature, salinity and lighting in the first instance. However in future we may also wish to control pH, oxygen and turbidity so the controllers will need to be expandable to incorporate these features.

Q: You require a redox probe – does this mean you will be using ozone?

A: No we will not be using ozone but we wish to measure redox as a proxy for water purity.

Lot 3

Q: What is required turnover of water in the tanks?

A: Minimum four times per hour

Q: A canister filter was included on the diagram supplied. These can tend to be a bit of a detritus harbourer in a marine system, we could look at using a pressurised sand filter for mechanical filtration and a fluidised sand filter for biological filtration which I think would give you better results and easier maintenance. Does that sound suitable for you?

A: We would consider sand filters instead of canister filters. We have however had issues with *Vibrio* in sand filters previously.

Q: Will all tanks share one filtration system or one system per tank?

A: Individual components (separate system) for each tank. We would need to be able to run each tank independently, with potentially different parameters, to each other.

Lot 4

Q: Do the lights need to be custom made to perform a specific function? Would an 'off the shelf' system be acceptable provided it could meet your requirements? Any more information on desired lighting spectrum? Any more information on stocking and light requirements in relation to husbandry?

A: An off the shelf system would be suitable but these are generally too expensive to fit within the scope of this project. Many projects hosted on these new tanks will require either no additional lighting or lights which mimic naturally occurring light levels. However, lights will be required for growing macroalgae – for this we require either lights designed to promote algae growth or LED panels at 6500k – both with very high output. In simple terms lights which mimic natural light levels and spectrum are desirable.

Q: Could you please share any available documents/specs for the required lighting?

A: Standard LED aquarium lights would be suitable – daylight or grow type lights for preference with 6500k and high output. We estimate a requirement for 200w per tank. We have also made LED panels in-house in the past and these are cost effective and simple to construct - in simple terms they consist of a number of 1m long IP68 cool white (6000-6500k) LED strips soldered in parallel and wired into a waterproof driver with a standard UK plug. The number of strips will depend on the power of the LEDs. The strips need to be mounted on a rust-proof backing to form a panel 1m x 1m which can be suspended over the new aquariums. These need to deliver 100 PAR at 60cm water

depth. We have found 14.4W strips to deliver the needed PAR at 30cm depth when placed at 5cm intervals. Ideally the light panel would be dimmable and either programmable or with the ability to wire them into our computer controller which would control their brightness and timing on and off.

Lot 5

Q: Where will solenoid valves be used?

A: Solenoid valves will be used to connect the tanks to the piped seawater which circulates throughout the MBA aquarium.

Q: What is meant by FPS sheeting?

A: Plastic sheeting to round out the edges of the tanks and create a baffle area separating the contents of the tank from any equipment (pumps, probes, heaters etc)

Q: What is the requirement for the waterproof cabinets?

A: IP68 rated cabinets for housing the aquarium controllers, powerhubs etc

Q: By caballing do you also mean electrical installation, e.g. sockets, consumer unit etc.

A: Yes

Lot 6

Q: Do you need the tanks and equipment to be pre-fabricated offsite, delivered whole and installed on site by a team or can equipment be delivered directly to the MBA and installed in-house?

A: There is no requirement for the systems to be pre-fabricated off site. It is envisaged that the components will be ordered and delivered separately to the MBA. We have a full time lab manager and engineer who will be on hand and taking an active role in setting up the equipment – particularly the tanks themselves. However, we would require someone/a team with expertise to come in and assist with the installation of the filtration equipment, computer controllers, caballing and other electrics, help set up the computer controllers and ensure that everything is functioning correctly. We are primarily interested in appointing a contractor who has experience with this type of equipment and set up, who can ensure it is installed and functioning correctly, and advise the lab manager on proper upkeep. It is envisaged there will be at least one MBA member of staff on hand providing assistance with the installation at all times.