



Mutiny Ozone Reactor Set Up Instructions

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Introduction

The use of ozone in seawater filtration is a powerful means of achieving the crystal clear, “fish floating in air” effect seen in the world’s most beautiful marine aquaria. An extremely powerful oxidizing agent, ozone will essentially “bleach” your seawater clean when used in a controlled environment in a safe and effective manner. Since the amount of ozone needed to clarify water is significantly less than that needed to kill most pathogens or other organisms, the usefulness of ozone extends even to systems that employ “probiotic” means of nutrient control. Coupled with an efficient protein skimmer, ozone can help improve water quality by breaking down large organic molecules into components more suited to skimming or usable by bacteria. Ozone users frequently report an increase in skimmer productivity and almost always in better water clarity and overall system health. It is important to note that ozone can be a dangerous substance when used improperly. Failure to adequately destroy ozone and remove oxidation byproducts via suitable ozone reactor post-filtration can result in harm to both aquarium inhabitants as well as people. Be sure to follow all safety guidelines according to your ozone generator’s documentation.

How our system works

The AVAST Mutiny ozone reactor series is designed to react seawater in a pressurized, ozonated air environment. The efficiency of this process is maximized by balancing water throughput with contact time as water is sprayed over a bed of thin HDPE ribbon media in an atmosphere of ozonated air. The high surface area of this media allows much better gas exchange and oxidation of organic material than simply bubbling ozonated air through a column of water, as when using ozone in a protein skimmer. The media also increases dwell time, since it creates a circuitous path for the water to reach the bottom exit.

Our reactor mixes water and air via custom designed conical spray nozzle and sprays this mixture into a diffuser chamber designed to distribute water over the ribbon media. Once the water reaches the bottom, it is forced up the output tube and into the carbon post-filter where residual ozone and oxidation byproducts are removed. This path of water flow, coupled with the sizing of the fittings and pipe, is what creates a “pre-set” internal pressure, eliminating the need for an expensive stainless steel pressure gauge. All of our reactor sizes, when driven with the recommended water pump (or flow rate), will run with an internal pressure around 3psi. We recommend a Luft pump or similar air pump capable of producing at least 2 scfh (60lph) at 3psi in order to inject the appropriate amount of ozonated air.

Included with the reactor is an accurate Dwyer airflow meter. During testing, we found this device to be invaluable in determining how much ozonated air was moving through the reactor, and it serves as a quick at-a-glance test to ensure everything is running properly. Coupled with a performance curve of your chosen ozone generator, the air flow meter will tell you how much ozone you are using to achieve various water quality goals. For example, you may find that 100mg/hr at 2scfh will remove any visible yellow tint from tank water. Below, we give general guidelines for dosing ozone but since each system is different, some experimentation may be needed.

Technical Data

Mutiny I

200g tank size up to 100mg/hr o₃

Footprint- 5x5x22

Water pump- Mag3 or equivalent

Air Pump- Luft Pump or equivalent

Carbon Postfilter- MR5 with 7 cups of carbon or equivalent reactor

Mutiny II

400g tank size up to 250mg/hr o₃

Footprint- 7x7x22

Water pump- Mag5 or equivalent

Air Pump- Luft Pump or equivalent

Carbon Postfilter- MR5 or MR10 with 7-12 cups of carbon or equivalent reactor

Mutiny III

600g tank size up to 500mg/hr o₃

Footprint- 9x9x22

Water pump- Mag7 or equivalent

Air Pump- Luft Pump or equivalent

Carbon Postfilter- MR10 or MR16 with 14 cups of carbon or equivalent reactor

Setup

Your AVAST Mutiny series reactor has been tested and supplied with the reactor media, it is ready for installation when you receive it. The only steps you need to take is setting up your air meter and the ozone delivery system of your choice.

1. Remove the Dwyer air meter from the box. There are metal connectors on the ends of the air stems of the meter, these must be removed. Simply pull **straight** out and they should come off, don't wiggle them off, or you risk snapping the polycarbonate stems.
2. The air meter comes with a stand that may be used in 2 different configurations. If you wish to mount it directly to the reactor, loosen one of the thumbscrews on the reactor and place align the threaded hole of the acrylic holder to the bottom flange. Then screw the thumbscrew back on, through the hole and tighten. The gauge slips in the holes and the silicone tubing holds it in place. The holder may also be used as a stand by flipping it over, simply slide the gauge in and use the silicone tubing to hold it in place.
3. Connect the water supply line from your feed pump to the center 1/2" barb fitting on the lid.
4. Connect all parts of your ozone generator as per manufacturer's instructions. Generally, you will place the air pump first, then run it to your air dryer (if required), then the generator, and finally to the bottom stem of the supplied air meter. From the top of the air meter, install a short piece of silicone tubing to the supplied check valve and finally connect another short piece of silicone tubing from check valve to the kynar fitting on the reactor lid.
5. Connect the output of the reactor to your carbon post filter using the supplied silicone tubing. We suggest a top-down water direction for the best ozone scrubbing potential. If you're using an upflow type reactor for carbon, simply reverse the tubing connections to achieve this. If using our media

reactors, the water from the ozone reactor should enter by the perimeter fitting and exit via the center fitting. Please check with the manufacturer to verify that your carbon filter is ozone safe before putting into operation.

6. The return from the carbon filter to the tank should be placed in the sump. A small amount of carbon scrubbed air will bubble out this output tube along with the water. If microbubbles are a problem in your sump, you can ziptie a small piece of foam to the output of the carbon postfilter tubing to eliminate this effect. We suggest running the output near the input of your skimmer which is an area that is usually baffled to prevent bubbles from escaping, this also will increase the protein skimmer potential. Lastly, we recommend keeping the return tube from the carbon post filter near or below the top of the reactor. If the tube is raised too high, such as to the top of your tank, the added backpressure on the system may result in too low of both water and air flow rates for the suggested pumps.

7. You can now turn on water pump and air pump and test for correct operation. Let the system run for 24 hours before turning on your ozone generator. Note that water flow through the ozone reactor system is designed to be slow. As little as 0.25x/hr of water flow through the reactors (where x is your total system volume) is enough to achieve excellent cleaning of the aquarium water. This slow water flow ensures adequate contact time for the ozone and water, as well as carbon scrubbing of the residual ozone and oxidative byproducts.

Monitoring/Control

You should monitor the air meter to make sure you are delivering a minimum of 1scfh-2scfh of air/ozone to the reactor.

ORP monitoring/controlling equipment should be installed per manufacturer's instructions. Please keep in mind that ORP probes may take up to 2 weeks to fully stabilize in your aquarium before providing an accurate reading. GO SLOW. The maximum ORP level should remain below 450mv. Note that a low ORP reading is not an indication that the ozone system is malfunctioning. ORP is a very poorly understood metric in marine aquaria, and many external factors influence a probe's measurement. We recommend judging effectiveness based on visual results, even if that measurement is subjective. One simple qualitative measurement involves holding a piece of white paper on one side of your tank, and looking at it through the water. After running the ozone for a few days, the paper should appear white rather than off-white or yellow, which is common before ozone use.

Maintenance

The ozone reactor itself should not require any regular maintenance. If for some reason you need to disassemble the reactor, please refer the YOU built assembly manual for a thorough description of how all parts are fit together. The media may develop a yellow tint. This is not an indication that the media is breaking down, but simply a light coating of oxidative byproduct that can be removed if desired, but in our experience is completely harmless.

Carbon should be changed every 2-3 months in your post filter and the air check valve should be replaced every 3-4 months regardless of its operation.

If you notice a slowdown in water flow, check for obstructions in the spray head such as tiny snails. An intake screen for the water pump may be needed to prevent small animals from clogging the spray head. We also recommend against the use of very fine particle carbon, such as ROX 0.8, in the carbon postfilter as it can catch small particles and block water and air flow. Larger granule lignite carbon has proven to work best.

Warranty and contact information

AVAST Marine Works products are warranted for a period of one year from the date of purchase against defects in materials and workmanship. AVAST will provide necessary parts and factory labor to repair or replace any failed component without cost to the Buyer.

Service

Warranty shall be void if any alteration or service is performed without written authorization from AVAST Marine Works or if the equipment has been connected to incorrect power. Buyer will be responsible for requesting warranty service through the AVAST Marine RMA process which requires buyers to return the defective unit for repair. The Buyer is liable for properly packaging the equipment and shipping cost for the initial return for repair. Return shipping cost is covered by AVAST if within the warranty period.

Equipment damaged due to accident, neglect, abuse, misuse, natural or man-made disasters is not covered by this warranty, and the Buyer will be contacted with cost and approval for repair.

Liability

In no event will AVAST Marine Works be liable for any lost livestock, profits or any special, indirect or consequential damages due to loss of use.

The laws of the Commonwealth of Virginia will govern this warranty plan.

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