



MEDIA REACTOR KIT

Skill Level: Beginner

Tools Required: Scissors or razor blade

Other Materials: Teflon tape

Time to Build: Approximately 1 hour not including drying time

Version: 2011 tapped lid design, ver 2.3

10/14/11

Congratulations on your purchase of an AVAST Media Reactor kit! With just under an hour of your time and a by following some simple instructions, you can be the proud builder of a new Media Reactor that would retail for more than twice as much as this easy to build kit.



Design Goals

The primary design goal for this project was to create an extremely durable, external fluidized reactor that was easy to put together for the first time builder and provided nice looks, adaptability, and easy maintenance all with a fantastic price tag. We wanted to simplify the design as much as possible and eliminate as many unnecessary parts to keep things straight forward. Emphasis was put on 3/8" thick flanges and base that give the reactor a nice heavy duty feeling about it and will provide a nearly unlimited life. Lastly, we wanted to size the reactor so it could be used on a wide variety of tank sizes for various applications; final specs allow for up to 5 cups of media to be fluidized in the reactor.

Material and Parts Selection

Based on the above design goals we selected a combination of off the shelf parts combined with CNC milled components to keep the cost reasonable. The input and output of the reactor are 1/2" NPT barbed ell union fittings. The tapped lid will allow the builder a wide variety of installation possibilities. Connection of the down tube assembly and the lid of the reactor are done with a 1/2" pvc coupling, this provides a nice and easy slip-fit mating of the parts.

The combination of the milled media plates and the mesh screen provide a nice and fine mechanical filtration with an extremely low maintenance solution. This combination can be used for several months with very little clogging (great for phosphate removal media).

Mating full 3/8" thick flanges with a fat EDPM o-ring in a recessed groove meant that only four thumbscrews are needed to get a secure seal of the lid with very little pressure. The clear top lid provides an easy window for viewing this watertight seal as the o-ring compresses to the lid.

Final Thoughts

The end result of this project is a great high end media reactor that you can be proud of building yourself. Assembly time is pretty quick and can be completed in about an hour over the course of 2 days. We tried to write the assembly instructions with as much detail as possible so while it may seem intimidating at first glance, we suggest running through the instructions the first time with just dry fitting all the parts together, then after your are familiar with the steps and how everything fits together you can focus on lining everything up perfectly and getting nice glue joints. We hope you enjoy building this kit as much as we enjoy putting them together! If you have any questions or comments please do not hesitate to contact us.

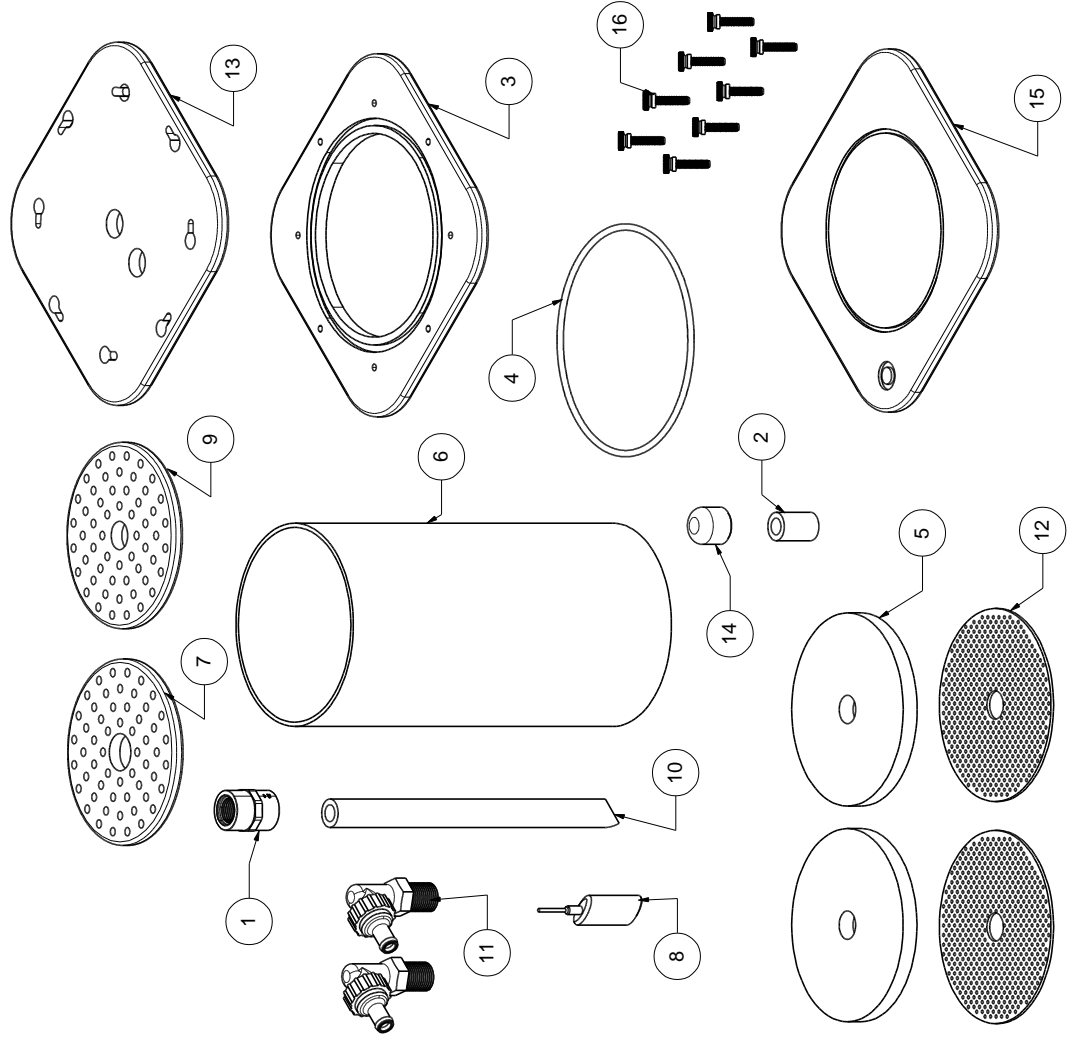
Dan Lichens and Justin Casp,

Captains

Avast Marine Works

MR Series Reactors

MR16-12 shown



Item Number	Quantity	Part Name
1	1	Threaded Coupling
2	1	Short 1/2" Pipe
3	1	Bottom Flange
4	1	O-ring
5	2	Foam Disk
6	1	Main Chamber
7	1	Top Media Plate
8	1	Glue
9	1	Bottom Media Plate
10	1	Down Tube
11	2	Union Connectors
12	2	Mesh Disk
13	1	Keyhole Top
14	1	1/2" Cap
15	1	Base
16	8	1/4"-20 Thumbscrews

Preface: General assembly and solvent gluing tips

1. Test fit all parts prior to application of glue. Light sanding of some inside edges of holes may be necessary to make a snug but not overly tight fit.
1. Prep all surfaces by wiping with a damp, lint free cloth then drying prior to application of glue.

Part 1. Media Chamber assembly

1. Place the bottom flange on a flat surface so that the o-ring groove is facing down.
2. Insert tube into the flange and press firmly until the tube is touching the work surface.
3. Now pull the tube back up slightly so that it is only inserted into the flange about 1/3 of the way.
4. Run a 1/8" bead of glue around the outside of this joint.
5. Press the tube back down so that it now touches the work surface again.
6. Run another 1/8" bead of glue around the same joint since most of the first bead will be between the wall of the tube and the inside of the flange.
7. Let joint dry for a minimum of 4 hours. Do Not place a heavy object on the tube to weigh it down, it is not needed and could possibly damage your reactor.
8. After the flange has had a chance to dry, gently lift it up. If any glue has seeped through the joint it may be slightly stuck to the work surface. Just stick a putty knife under the edge of the flange and gently pry it up, working your way around. If there is any residue left on the reactor, resist the urge to try and remove it until the reactor is completed and had time to fully cure. This can be done very easily with fine grit sandpaper or steel wool but, attempting to do this before cured could potentially weaken the joint.
9. Now flip the reactor over and place the tube in the groove for the base.
10. Place a bead of glue in the groove of the base and then insert the top half of the reactor.
11. Now looking from the top, align the base and the top so that the base and top are square to each other. You have about 30 seconds of work time to do this before the glue will begin to setup.
12. Now run a 1/8" bead of glue around the outside joint at the base. Again, Do Not place anything on top of the reactor to weigh it down, firmly pressing it into the groove is all that is needed, more could damage your project. Let the chamber cure overnight.
13. Glue short pipe stub into the hole in the base. Lightly press the cap onto pipe stub.
14. The following day you can put the o-ring in the groove and screw in the thumbscrews.

Part 2. Down tube and Media Plates

1. The filter plates have slightly different diameter holes in the middle. One fits over the 1/2" tube and the other fits over the coupling.
2. Slide the larger hole plate over the coupling to confirm the fit. The plate should rest on top of the central hex nut portion of the coupling, with the threaded side being up. Once you have confirmed the fit, run a bead of glue around the top of the joint and twist it back and forth a little to get the glue to work into the area between the coupling and plate. Set aside and let cure overnight.
3. Take the remaining filter plate and slide it on the end of the down tube that has the beveled cut. You want the plate to rest about 3/4" from the end of the pipe. Work a bead of glue into the joint the same way you did in the last step.
4. Trim the mesh disk to fit the media plates and down tubes if necessary.

Part 3. Final Assembly

1. Wrap each black nylon fitting with a few turns of teflon tape. For 3.5" diameter models, one fitting is straight and the other is a union ell. The ell goes in the center hole and should be installed first. Tighten so that the center fitting is flush with the reactor lid. This will expose threads on the other side of the lid.
2. Screw the coupling/media plate assembly onto the center fitting's threads. This does not need to be tight; just enough to hold the media plate in position. The down tube should be disconnected from the slip end of the coupling.
3. Install mesh or foam disks on media plates as needed for your particular media. Disk should go on top of the lower plate, and underneath the top plate.
4. Use the cap on the pipe stub as a temporary down tube cover. Lightly rest it on the down tube while pouring in media, then return to holder when finished.
5. Install lid, making sure to center the down tube before pressing the lid and coupling/media plate assembly into position.
6. Tighten thumbscrews and check for positive o-ring seal all around the reactor.
7. Connect supplied tubing and ball valve to a pump or water source of your choice.

Tips and Tricks

1. A useful modification to help biopellet media fluidize very evenly is to remove the bottom media plate altogether, and cut the down tube square so it extends to about 1" (2.5cm) from the bottom. Be aware that in order to avoid backsiphoning pellets when the pump is off, you should make sure the output tube is kept below the water level at all times.