

Installation Instructions:

Thank you for choosing the Synergy Reef Shadow® Overflow. Please note that this is a Do-It-Yourself project and can be installed in either glass or acrylic aquariums. Always keep in mind that working with power tools, glass and acrylic have inherent dangers, including personal injury, electrocution, accidental death, or cracked glass, so please be careful and wear gloves, shoes, pants, eye protection, etc... If you have any questions or concerns, please [contact us](#).

Prior to installation, be sure that you have everything you will need to complete the installation. This includes, but is not limited to the following:

1. Aquarium, either glass or acrylic, if it's glass please make sure the panel you are going to drill is NOT TEMPERED! If you are uncertain about this then STOP and please contact the tank manufacturer. If you attempt to drill a tempered panel, it will shatter.
2. Cordless drill with adjustable clutch. We recommend the use of a cordless drill to avoid electrocution, as water needs to be applied over the hole saw during drilling. The clutch will limit torque transfer to the glass, reducing the chances of cracking the glass. Always set your torque (clutch) to the lowest level on the drill and adjust accordingly, patience is a virtue when drilling glass. Drilling template (included with the Synergy Reef Overflow Kit and you can download it here http://www.synergyreef.com/Manuals/Synergy_Reef_Drilling_Template_16_Shadow.pdf).
3. Tape measure, to determine mounting location.
4. Permanent Marker or wax pencil to mark mounting location.
5. Spring clamps and/or double sided tape to hold the template in place while you drill.
6. Water source. Spray bottle, garden hose, bucket, etc...
7. Correct Holesaw:
We recommend a [63 mm Diamond Holesaw](#) for best results A [65mm Diamond Holesaw or 2.5"](#) can also be used for both our 16" Overflow and 20" Overflow.
- For glass you will need to purchase a diamond coated holesaw bit
- For acrylic you will need a standard holesaw bit with teeth sold at most home improvement stores.
8. Synergy Reef Shadow Overflow Kit.
9. 1.5" PVC for internal box. We have pre cut [Internal pipe kits](#) available here in many colors.

What Glue can I use to install the pipes on the rear box?

- Use only these following solvents on the Rear Box fittings:
 - We recommend using [Rectorseal® Mike 425L](#) as the best solvent. If that cannot be found then Standard Clear Medium PVC Cement (Sold at local hardware stores) will also work, but may cause crazing on the rearbox fittings. This crazing will not affect the fittings.
- ***DO NOT USE the any of the following as they can damage the Rear Box:
 - ABS TO PVC Transition cement (Teal Colored glue)
 - Purple PVC Primer. This can damage the plastics. Only use clear cleaner made for ABS plastics if needed.

Drilling and Installing:

1. Determine your desired water level. We find with typical applications within our recommended flow rates the water level in our boxes will rise ¼" to ½" (depending on your GPH of flow) from the bottom of the teeth slots. So mark the drilling template about 1" below the top and this is a rough guide as to where you water level will be. Use this measurement to determine where you would like to place

your internal overflow box. Once you have your desired water level determined you can measure and mark how far down the holes will be from the top of the tank using our template. We recommend a minimum 1.5 to 2 inches from the water level to the top of the tank for rimless aquariums. Tanks with plastic bracing or euro bracing, the water level will be higher (depending on where the trim is located). Leave 1/8" to 1/4" Clearance from trim to top of template so there is no interference with the trim and front box.

2. Now locate the drilling template where you have determined you need to drill the hole(s). Note that the template is the same outline as the actual Front Overflow Box. Make sure the template is in the CORRECT UP orientation. Manually align the template on the inside of the aquarium and MARK the holes with your marker.
3. After marking the holes locations, use the Rear Overflow Box and align it to the circles you just drew on the aquarium. If the rear box aligns with the holes and is not hitting the rear plastic trim on trimmed tanks (make sure to test with the lid on the rear box as well), then you are ready to mount the template and drill. Mount the drilling template on the outside of the aquarium. You can use duct tape to mount the template, although we do recommend using spring clamps to hold it in place. DO NOT use screw type clamps, these can cause too much localized stress and crack your glass!
4. Make sure to protect the opposite panel and position a bucket or reservoir to catch the plug when it drills through. Also if placing a bucket on the glass, protect the glass from the bucket by placing a piece of paper towel and/or clean cardboard so that the bucket doesn't scratch the tank.
5. Ideally you will use a cordless drill with an adjustable clutch that can be set very light. This will prevent extra force on the glass should you bind the bit during drilling. It is now time to start drilling!! Pour some regular old water in the template hole to cool and lubricate the hole saw, you will want to keep the bit wet through the whole drilling process. The provided template will keep your hole saw in place. Water will channel thru the template. This is normal.
6. After drilling for a bit you should be able to remove the hole saw from the template and see a groove starting in the glass. Once you see this groove you may want to remove the drilling template; it has served its purpose. Be sure to start both holes before removing the template.
7. Remember to keep the hole-saw wet through the process for cooling and lubrication. As you get near to the end of drilling the hole you will see the water start to leak through, this is the sign that you are close. At this point you will want to use very light pressure and patience to minimize chip out on the opposite side. However, some chips is normal and likely so don't worry about them as the gasket will cover and seal them.
8. Once you drill both holes, clean up the drilling mess and dry the aquarium and proceed to install the boxes.
9. Remove the locking nuts from the front overflow box. Place 1 gasket on each of the bulkheads on the front overflow box and mount the Shadow Overflow by inserting the bulkheads through the holes you just drilled from the inside of the tank, this gasket will be between the front overflow box and the tank. Get another gasket and put it over each bulkhead on the outside of the tank. This gasket will be between the tank and the external box. Insert the external box through the bulkheads and secure it in place with the 2 locking nuts your

removed earlier and hand tighten. Over tightening the bulkheads can cause the gaskets to leak. See figure A.3 on next page.

10. Remove the rear box from your tank and your overflow is now ready to plumb any way you choose. We recommend using 3 small pieces of 1.5" PVC (4" Pre Cut kits are available here) and connection these to the rear box and attaching unions to each. See figure A.2 for details. This makes it easier to remove or attach the pipes if needed for maintenance.

Make sure to support the external plumbing properly to avoid any weight pulling down on the overflow rear box. The overflow was NOT designed to have the plumbing hanging from it. We sell a few different pipe hanging clips here: [1.5" Clic Clip](#) or [1.5" Cobra Clip](#) Plumbing options for inside of the rear box: **DO NOT GLUE** any of the inside parts together.

OUTSIDE OF THE REAR BOX:

**Remove from tank prior to gluing pipes to avoid damage.

DO NOT USE ABS TO PVC Transition Cement!

**DO NOT Force Dry fitted pieces into the bottom of the rear box. This could possibly damage the overflow.

Only push PVC with a chamfered edge and with PVC Cement into the holes. ***

1. Attach 3 short pieces (approx. 4") of 1.5" PVC to the bottom of the rear box with Medium Clear PVC Cement.
2. We recommend you using Medium Clear PVC Cement on outside of the rear box when gluing the PVC pipes to it. We have found that Standard PVC Cement will work the best, but extreme care needs to be used when gluing to make sure the pipes do not slip out or the ports get damaged from too much force. If the proper amount of glue is used it will not take any force to push the pipes into the ports. See figure A.2 Below:



FIGURE A.2

3. We recommend that you attach 3 x 1.5" Unions to the 3 pieces you just glued into the bottom of the rear box. This will allow for easy removal of the overflow if needed in the future or for moving the overflow to another tank later.

INSIDE OF THE REAR BOX Assembly:

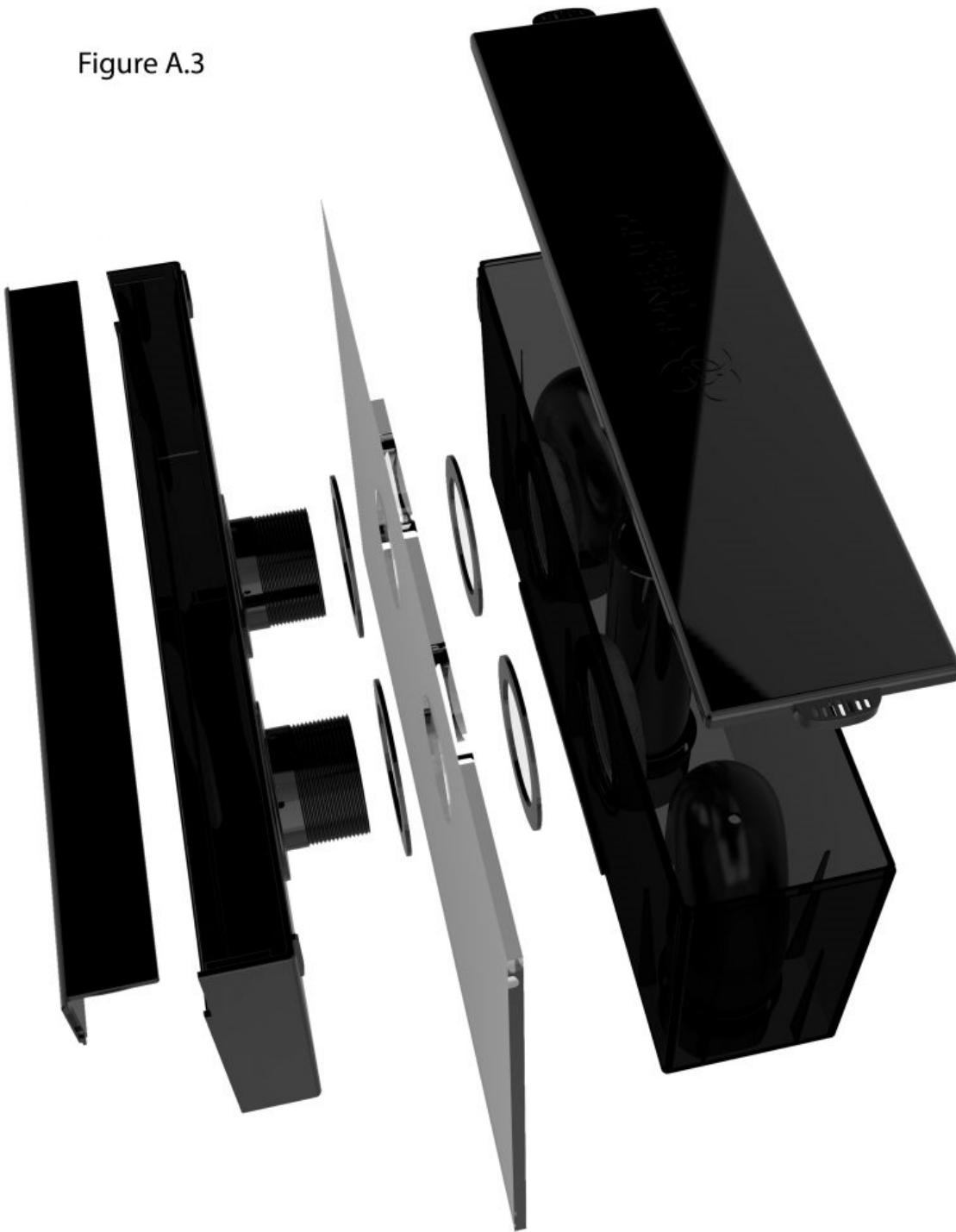
---**DO NOT GLUE THESE TOGETHER**, Dry fitting it all that is needed.---

1. First Cut 1.5" PVC into 3 pieces. 1 x 6.25", 1 x 2.75", 1 x 3.5" These are just rough sizes and you may need to slightly modify the lengths to your system's flow. More information on Tuning the overflow can be found [Here](#).
2. You will need to attach the following parts:
 - a) 2.75" PVC Pipe to Synergy U-Pipe elbow (included in kit)
 - b) 3.5" PVC Pipe to Synergy U-Pipe elbow (in some setups you may not need to use the U-pipe on the secondary drain)
3. Connect both of the U-Pipe assemblies you just made into any of the holes inside of the rear box assembly.
4. Connect the 6.25" PVC Pipe into the last open hole inside of the rear box assembly. This is your Emergency drain.
5. See FIGURE A.1 for finished assembly.



FIGURE A.1

Figure A.3



SYSTEMS

SYNERGY REEF

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