



CSI 'PEGLEG' RECIRCULATION MOD

Skill Level: Beginner

Tools Required: None

Other Materials: PVC glue

Time to Build: Less than 30 minutes, not including drying time

Version: 1.0, 10/21/11

General Recirculation Theory

With a recirculating style skimmer, water throughput (i.e., water from the aquarium passing through to be processed) is decoupled from water circulation. The main skimmer pump, in our case, a pinwheel pump, is plumbed into the skimmer in a closed loop, so that it draws water from the skimmer body, injects microbubbles, and returns back to the skimmer body. Separately, process water is fed into the skimmer via small dedicated feed pump or tee from a larger pump manifold. This water mixes with the recirculating pump and exits via effluent pipe, back into the sump. This design differs from traditional skimmers which have the main pinwheel pump draw water from outside the skimmer, inject air bubbles, and fill the skimmer body with the mixture.

There are two major advantages to a recirculating design: control over contact time and increased independence from external water depth. By varying the external feed pump rate, we can allow process water to remain in the skimmer body for a longer period, hence more thorough scrubbing of skimmate from the water. Of course, we need to balance the throughput and dwell time; too long of a dwell time and the aquarium's volume isn't processed quick enough. Too high a throughput, and some skimmable substances won't be removed. Balancing this is relatively straightforward. We should aim for approximately .75x to 1x the total system water volume per hour of throughput.

Traditional "single pass" skimmers are often plagued by the requirement that they sit in a dedicated skimmer chamber in a sump, often within a tight tolerance of +/- 1 inch of water. This is because any change in the outside water level will typically affect the internal water level accordingly. If the water deepens externally, head pressure on the pump is reduced, and the skimmer overflows. This is particularly bad if the collection cup is filled with nasty waste, which can be quickly liberated back to the tank all at once. A recirculating design with feed pump tends to be mostly independent of the external water level, as the feed pump or manifold has a constant output pressure and flow rate, and is affected much less by its water depth, at least on the order of a few inches difference. The result is less hands-on adjustment of a recirculating skimmer when water levels change, such as during a water change or evaporation top-off cycle.

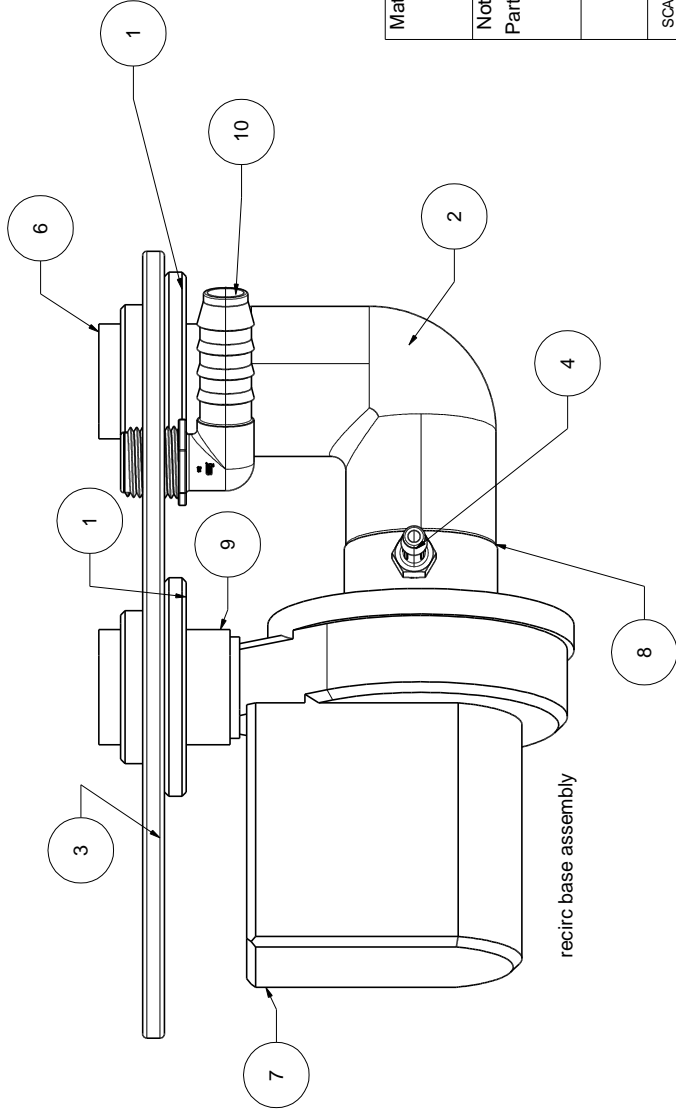
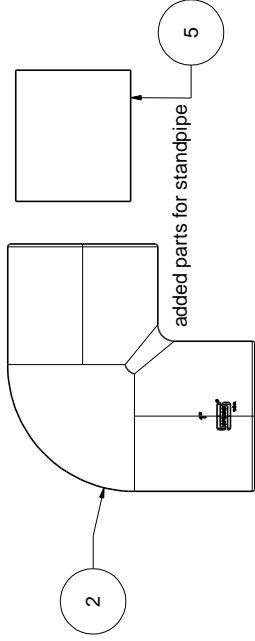
Assembly Instructions

1. If not already done, attach venturi fitting (8) to pump volute intake stem. A trick to do this in a non-permanent fashion (perhaps to change the orientation of the air barb (4) later) is to apply PVC glue to the inside edge of the venturi fitting, and allow it to dry without pressing it onto the pump. The dried glue will cause the venturi fitting to be a tight friction fit with the pump volute stem. The result is a securely attached venturi fitting that can be removed later and changed.
2. Do the same with the 1" elbow (2), connect to venturi. This can be glued or tightly friction fit.
3. Glue the 2.5" pipe (6) into the elbow in step 2. You may want to sand the remaining exposed rim of this pipe to make it easier to install the uniseal.
4. Fit both uniseals (1) into the new skimmer base (3), then push the pump assembly into the uniseals. Be sure to install so that the groove in the base is facing up and away from the pump.
5. Install the input elbow (10) and effluent pipe stub into the skimmer base (3).
6. Replace the old base with the new skimmer base (3) + pump assembly. The old base is no longer needed.
7. Reconnect air tube and connect water feed to the input elbow, and fire up the skimmer! Tune the feed rate as described above, in the .75x to 1x tank volume feed rate.
8. Parts (2) and (5) are for the effluent tube, in case alternations need to be made with that assembly.

AVAST MARINE WORKS

CS1 Recirc Kit

Part #	Quantity	Part Name	Comment
1	2	1 Inch Uniseal*	1 included in base kit
2	2	1" Elbow	
3	1	Recirc Base	
4	1	Air Barb*	Include with Pump
5	1	1.5" Long Pipe	
6	1	2.5" Long Pipe	
7	1	PSK 1000*	Included with base kit
8	1	Venturi*	Included with base kit
9	1	Threaded Adapter*	Included with Pump
10	1	Input Elbow	



Material Properties

Notes

Parts marked with an * are included in the CS1 base kit

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REV
1.1

SCALE 1:2

SIZE **A**

9-27-11