Suction Sampler

Purpose of this document

This document is intended to train a person to use and handle the suction sampler. It will also help demonstrated the limits and capabilities of the device.

Introduction

The Suction Sampler is an underwater vacuum cleaner with eight ‘bags’ instead of one. The ‘bags’ are really two liter jars with filters which trap whatever goes into the inlet. There is no way to reverse the flow on the device so you cannot blow things out of the inlet hose or jar. Once it is in the hose, it is going to end up in the jar unless it is too large and lodges in the hose. Inside each jar there is a filter which prevents anything larger than a certain size from escaping. The filter material is required to be 1mm or finer. This 1mm mesh size limitation prevents damage to the pump which is in line downstream. Any debris making it past the filter will also travel through the impellor of the pump. If it is large it will jam the impellor. A finer filter means that the filter will collect smaller particles and be blocked faster as well.

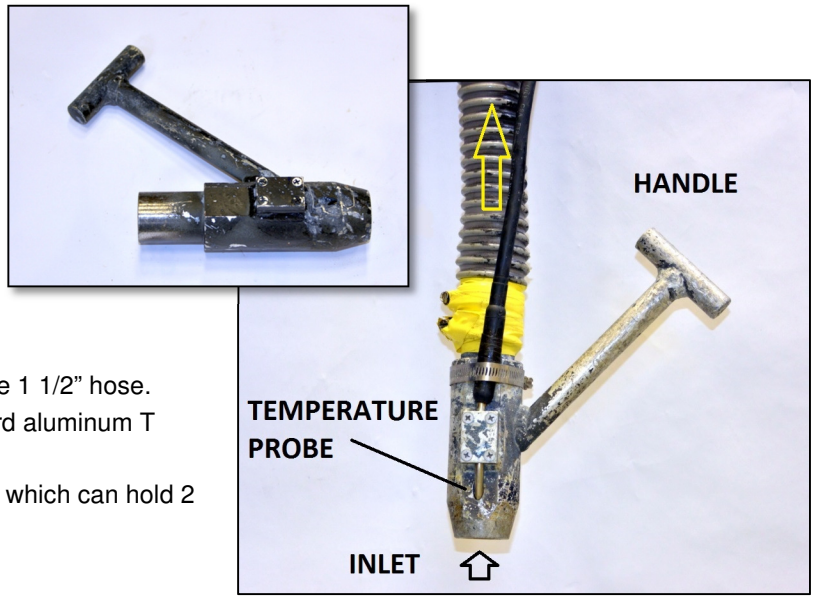
The jars can be indexed so that each jar is a different sample. They are not perfectly sealed but there is virtually no mixing between the jars. The carousel must be rotated to position in order to be filled, however the carousel only rotates in one direction. This is not a problem but it does mean it takes a little more time.

The Suction Sampler has been used for many years and has been well refined to its purpose. Filter material is typically provided by the client and is readily available from a variety of sources.

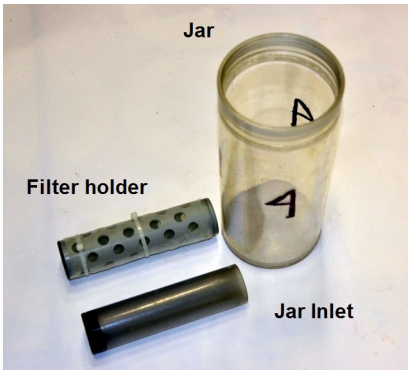
A mesh size of 1mm can be used for most general purposes such as small rocks, sand, worms, or clams. Finer mesh is needed for sediments, bacterial matting, or soft bodied animals.

Contents

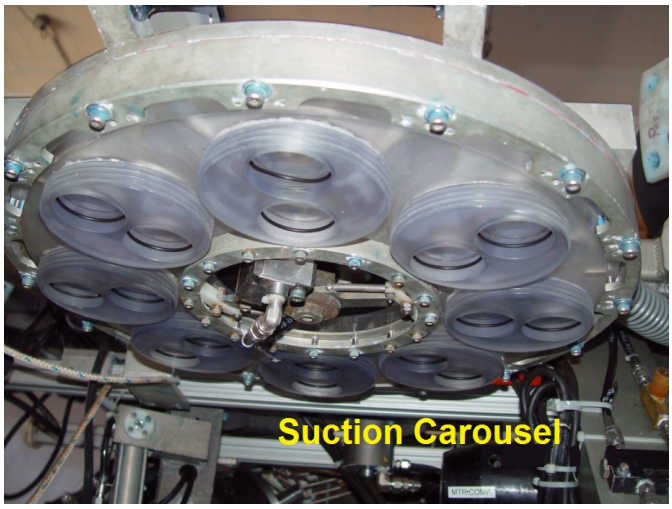
Parts Description



1. Inlet nozzle – This is made of aluminum and has an inlet orifice much smaller than the hose.
    a. Temperature Probe- bolted onto the outside of the nozzle, it measures the temperature INSIDE the nozzle.
    b. Hose- grey reinforced flexible 1 1/2" hose.
    c. T – handle- This is a standard aluminum T made form ¾" material.
2. Suction Jar- A clear plastic assembly which can hold 2 liters of fluid.
    a. Suction jar inlet-
    b. Suction Jar filter holder-



3. Carousel – This is the main rotating body of the Sampler
4. Outlet Hose – this carries fluid from the Carousel to the pump.
5. Pump – The pump drive the fluid through the system. The pump is under the port side of the frame aft and inside the skid.

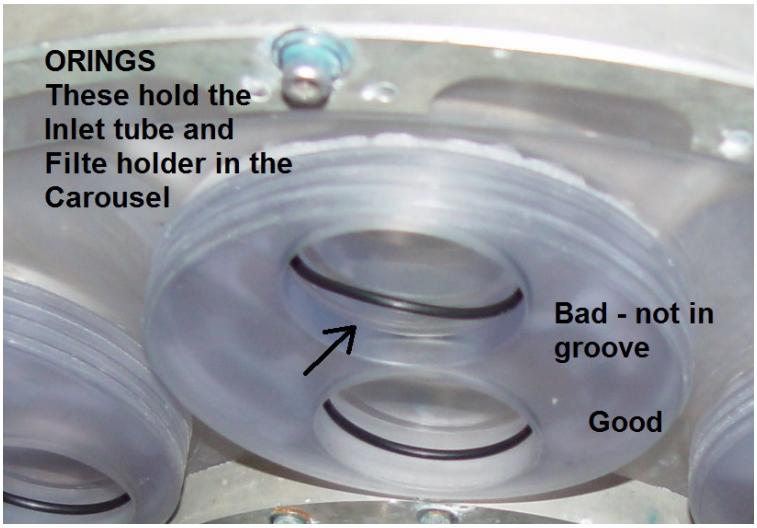


Working with the Cores

1. Preparing the Suction Sampler.

A. Inspect the suction sampler parts for damage or absent bits. The jars and filters should be free of debris and clean. Be sure all the jars are marked with a number or coloured tape so they can be identified.

B. Inspect the Carousel carefully and give it a little spin. It should make a sharp clicking sound as it turns. This is the lever arm that pushes the Carousel around. The clicking is the arm indexing to the next position.



C. Check the inlet nozzle and hose for debris and obstructions.

D. Check that all the Orings are still in the Carousel. And in the groove.

E. Prepare the Inlet tubes and filter holders.

1. The Filter holders are wrapped with a piece of mesh 7”x7” with 1mm or smaller size.
   a) Cut the mesh to size if it is not already.
   b) Wrap mesh around Tube
   c) Ty wrap ensuring good (½” or more) overlap.
   d) Trim ty wraps with flush cutters

2. Inlet tubes should also be pressed into the Carousel. There are black O-rings in the carousel which hold the tubes in place. Periodically, an inlet tube will not stay in place. A wrap of black tape or a different tube should solve the problem. The inlets are simply for directing the incoming material away from the filter.

If either the Filter Holder or the Inlet Tube are loose in the Carousel, they should be replaced. They are likely to fall out during the dive.

F. Screw on the Jar. This can be more difficult than it looks. The threads must be almost exactly perpendicular.

1. Fill the jar with water so it is not crushed. Fresh water can be used and helps to see the flow.

2. Select the correct Number Jar or rotate the Carousel so that the jar is in the correct position. This is only a relative position and it does not matter if the Jars count Up or Down.
3. Hold the Jar under the bottom with one hand and spin it with the other. The Jar should take about 4 rotations to tighten. It should be snug. Do Not Overtighten as the Carousel insert (threaded part) can be damaged and the entire Jar lost.
4. Jar 8 will normally be the Flush Jar. Put Jar 8 on with the Green filter as a visual indication.

2. Taking the Sample

This is very dependent on what the Sample is.

a) If there is some special purpose to the Suction Sampler then follow the procedure developed for that. This is a description of routine sampling.
b) Surface only. Often only the surface layer is desired. Your Ropos pilot and copilot should be informed directly during the dive
c) Large animals such as urchins or clams. The suction sampler is just a way of pick up an animal to put it in the biobox.
d) Fixed area, the approximate area sampled may be important. Imaging with the lasers is usually done before and after.
e) Similarly , fixed volume. A depth limit may be imposed as well as a restricted area.
f) Specific subject. Sometimes only a specific animal or type of rock is desired.
g) Cleaning or excavation. The suction sampler is sometime used to remove unwanted material from an area. Bear in mind the limited capacity of the jars for a task like this.

In general, the pilot and copilot should be consulted directly. Any detail that is important to the sampling should be conveyed both at the time and in the dive plan before the dive to ensure both personnel and equipment are well prepared.

3. Filter Material

a) Filter must be at least 1mm fine. This prevents damage to the impellor of the pump. The outlet from the jars goes directly to the pump and large pieces of rock will clog and damage it.
b) CSSF has a limited supply of 1mm mesh filters available but anything else must be provided by the client.
c) Filter material should be cut in rectangles 5” x 6” to fit the filter holder tube and attached to the tube with three ty wraps.
d) The filters tubes should fit snugly into the carousel. Some tubes which are too loose can be fit more securely with a single wrap of electrical tape around the top of the tube. Ensure there is an oring in the carousel for each tube. This is what holds the tube in place and it will fall out otherwise.

Appendix A. Document Revisions

Rev #	Date	Name	Changes in Document
0	2014-02-28	Ian Murdock	Original
1	2015–04-12	Ian Murdock	Corrections to sampling, spelling