

TECHNICAL SPECIFICATIONS

The antifouling kit, installed by the measuring sensors of the Ocean Seven 316 probe, is composed of a central titanium electrode which supplies an electrical current towards six external titanium electrodes on which a copper foil (replaceable) surrounding the sensors, can be wrapped. In addition to chloride formation, there is copper dissolution in an ionic form by the sensors. The copper foil has a typical endurance of more than one year. The sensors are washed when the probe starts profiling.

The fouling probably represents the major difficulty during continuous monitoring of waters and, although many efforts in research at worldwide level have been dedicated to this problem during the past decades, a definitive solution is not yet available. Therefore, a compromise must be found each time according to the specific difficulty met with.

Since our 601 BUOY PROFILER monitoring system operates to study the environmental conditions where fishes grow, we have not taken into consideration the antifouling system based on the slow release of Tributyltin (TBT) oxide or other heavily poisoning chemical substances.

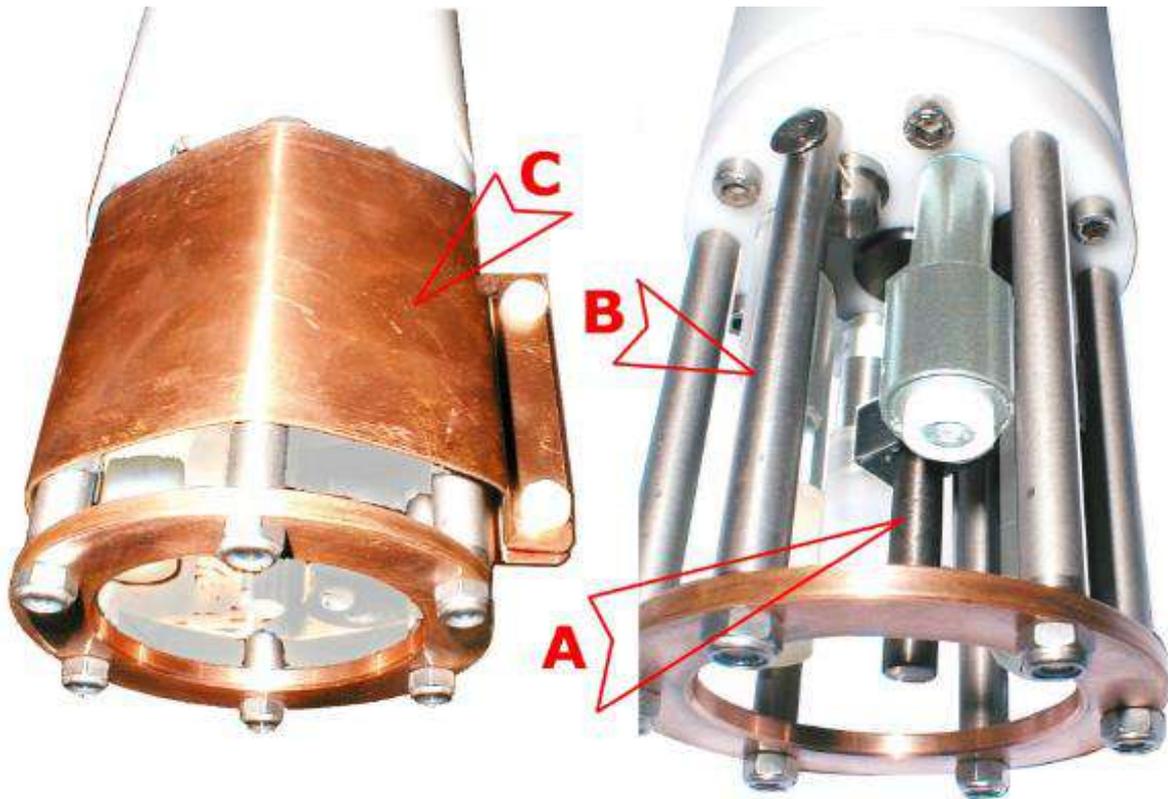
We have then decided to simply use metallic copper to act as antifouling protection by the measuring sensors.

A foil of copper (1 mm thickness) has been placed around the sensor cage in such a way that it can be easily replaced with a new one without damaging the measuring sensors and to also avoid reducing the flow of water to be measured. The presence of this simple device has, on average, increased the time between each cleaning from 1 to 4 weeks only with warm and very productive waters. This is because the metallic surface of the copper easily becomes oxidised in a few days and, after that, it loses most of its activity; in fact, copper is not able any more to dissolve in an ionic form in the water surrounding the sensors and the inside of the copper protection.

To avoid the copper passivation, we have installed in the centre of the probe, where the measuring sensors are placed, a titanium electrode which "impresses" an electrical current versus the copper foil. In this way the copper foil, which acts as a flow-measuring chamber, is always clean and so this allows the copper dissolution in an ionic form. This effect has drastically decreased the formation of fouling by the measuring sensors.

The current between the titanium and the copper electrodes is applied when the probe is not carrying measurements. Vice versa, when the probe starts descending, the current is not applied any more and the water to be measured flows between the sensors and washes them of the ionic copper previously dissolved. This improvement considerably increases the "time between cleanings" up to three/four weeks, depending on the water quality.

To the best of our knowledge, this kind of antifouling system does not appear in the scientific literature and not even an industrial company has ever used it until now. So, we intend to apply for a patent on it.



Legenda

- A) Titanium inner electrode.
- B) no. 6 titanium outside electrodes.
- C) Copper foil (replaceable).

Electrode polarization:

5 Volt Square wave @ 0.033 Hz (current, in sea water, 25 mA approx.)