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Salinity Measurement with Salinometer Accessories

OSIL Application Note

As the producer of IAPSO Standard Seawater, OSIL's Seawater Department spends a large proportion of their time monitoring the salinity of their products and raw materials. The production process begins in a tank which holds approximately 4,500 litres of seawater, which is refilled every nine months with north-east Atlantic surface water. Deionised water is then added to the seawater over a period of 30 days to adjust the salinity to between 34.99 and 35.01. Throughout this period the salinity of the tank water is monitored using a Guildline Autosal in OSIL's seawater laboratory.

Guildline's Autosal Salinometer is the industry standard salinometer and is widely believed to be the most accurate salinometer on the market today. The standard way to take sample readings using the Autosal is to introduce the sample into the salinometer using the internal air pump. This method has proved tedious and very time consuming with researchers and with this in mind OSIL developed a peristaltic pump unit to improve sample handling. The Salinometer Pump is now used by OSIL's Seawater Chemist, Nigel Higgs, every time the tank's salinity is monitored.

Guildline's Autosal Salinometer

Benefits of using the pump, explains Nigel Higgs, *"are that it greatly improves sample throughput thanks to its user-friendly design, which also makes sample introduction much more convenient."* The pump is attached to the shelf that the sample bottle would normally rest on and the uptake tube runs from underneath the pump into the sample bottle. The pump can be easily installed onto any Guildline Salinometer without alteration to the internal pumps, plumbing or wiring.

OSIL's Salinometer Pump

As well as managing the Standard Seawater Service, Nigel Higgs undertakes quality control and salinity analyses for various customers which can arrive in large batches. It is situations such as this where the pump saves the user large amounts of time. The placement of the pump means that the time it takes to change over samples is greatly reduced and there are no restrictions on the size and shape of the sample container as an extension tube can be added to the pump's uptake pipe.

It is common when using the traditional method of sample analysis that cross-contamination can occur between samples through drips from the uptake pipe. The Salinometer Pump prevents this because any remaining sample is secured within the pump by the internal rollers. The design of

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the pump also eliminates the need for the air-tight seal that the sample bottle is usually fitted to, which saves on replacement seals and again saves time when switching over samples.

When the correct salinity has been attained for a new IAPSO Standard, the seawater is bottled by OSIL and a selection are calibrated against potassium chloride standards to ascertain the salinity of the batch. Traditionally before every run the salinometer must be standardised and the correction noted. Then when analysing samples the double conductivity ratio reading must also be noted down, corrected by hand and entered into the Lab Assistant Software for the salinity to be calculated.

Modern salinometers now give users the option of outputting the collected data directly onto a PC. OSIL made the most of this feature and developed the Autosal Computer Interface ACI-2000, which was a welcomed addition for people like Nigel who had a large amount of samples to measure. The ACI-2000 automatically calculates the sample's salinity by downloading the double conductivity ratio from the salinometer in real-time. It also automatically handles the standardisation of the salinometer and inputs the correction into the results table, adjusting the salinity results accordingly.

"Using the ACI and logging software means no more transcription errors when noting or transferring results and significant time savings in data processing and reporting. Sample throughput is also more consistent through each batch of analyses as the operator is prompted at each stage," Nigel Higgs explains. The computer interface provides the Autosal with a RS232 communications link which Guildline's Portasal already possesses; the logging software is available separately for the portable salinometer.

OSIL Computer Interface ACI-2000

The data logging software allows the user to assign allocated time intervals for analysis to take place and it is also possible to set margins for the results so that the software alerts you when one falls outside user defined limits. Once the readings have been calculated by the software they are fully exportable into Microsoft Excel for further analysis.

The combination of the Salinometer Pump and Computer Interface ACI-2000 saves valuable time when analysing large batches of seawater and records and calculates the data in a more reliable and accurate way.

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