Application Note

THORNTON
Leading Pure Water Analytics

Fully Unattended, Automated Calibration

for Sodium and Silica Analysis

With power plants requiring measurements of sodium and silica at sub-ppb levels, analyzers need to provide reliable and sensitive measurements with minimum downtime. With fully unattended, automatic calibration and self-cleaning, analyzers can minimize operator error and provide reliable measurements at low concentration levels.

Overview

As power plants continue to grow in size and capital equipment becomes more expensive, it is very important to monitor and manage the quality of the pure water used in the power cycle. High levels of sodium and silica in the water can damage equipment like boilers and turbines, leading to expensive maintenance as well as unplanned shutdowns. That is why it is essential to ensure that the levels of sodium and silica in the water are the lowest possible and to have an early warning in case the levels start rising so that there is enough time to take measures.

This trend of maintaining sodium and silica levels at ever-decreasing sub-ppb levels makes it essential that the monitoring analyzers are reliable and sensitive enough. One of the factors affecting the reliability of the measurement is the calibration of the analyzer and the most effective way of ensuring a proper calibration is minimizing operator error. This will not only increase the reliability of the measurements post-calibration, but it will also save operator time and cost. This is important when budgets and manpower are already so constrained.

To achieve this, various levels of automation have been introduced in the calibration process by different vendors. These different approaches to calibration are outlined in Table 1, along with their features and benefits.

METTLER TOLEDO Thornton 2300Na Sodium Analyzer

The 2300Na Sodium Analyzer offers fully unattended, automatic calibration which limits operator interaction with the analyzer to just two tasks for calibration:

- Refill calibration standard bottle to ensure there is always enough standard solution for calibration
- Set the timer on the analyzer to schedule periodic automatic calibrations

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Additionally, this sodium analyzer offers automated electrode conditioning (self-cleaning process) to further automate the process and minimize operator error. In a sodium analyzer, the sodium electrode has to be etched frequently to ensure it is responsive and accurate. The traditional approach to that is to take the electrode out of the analyzer at each calibration and etch it with special solutions. The 2300Na Sodium Analyzer conditions the electrode in-situ during each calibration, which allows duration of six months between each manual etching. This provides a number of benefits in handling and the accuracy of the analyzer:

- Minimizes operator error during the etching process
- Eliminates the risk of damage to the electrode while handling it during etching
- Reduces operator time and cost needed for maintenance

METTLER TOLEDO Thornton 2800Si Silica Analyzer

The 2800Si Silica Analyzer also features a fully unattended, automatic calibration process. With operator interaction with the analyzer limited to refilling the calibration standard bottle and setting the timer to schedule calibrations, the analyzer ensures minimal risk of a bad calibration. This process, along with the zero calibration at the start of every measurement, ensures excellent repeatability and reliability of measurements.

With a one liter calibration standard bottle and four liter bottles of the reagents, the 2800Si Silica Analyzer saves operator time and associated cost for maintenance by reducing the frequency of refilling the bottles.

Calibration Choice

In selecting an analyzer, it is important to compare automated features to get a better understanding of the accuracy and reliability of the measurements. With acceptable measurement levels continuously decreasing, the reliability of the measurements of the monitoring analyzers takes on a greater importance. Using fully unattended, automatic calibration not only minimizes the risk of operator error and associated failed calibrations, it also reduces the frequency and cost of maintenance. With lower frequency of maintenance, the analyzers would be available for longer periods to monitor and ensure the quality of the pure water used in the power cycle.

Table 1

	Full Unattended, Automatic Calibration	"Automatic"/Semi-automatic Calibration	Manual Calibration
Level of operator interaction with analyzer	Minimal	Intermediate	Extensive
Start Calibration	Auto	Manual	Manual
Inject Calibration Standard	Auto	Semi-Automatic	Manual
Schedule calibrations	Yes - Timer Based	No	No
Risk of Bad Calibration	Minimal	Medium	High

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