

Fully Unattended, Automated Calibration for Sodium Analysis

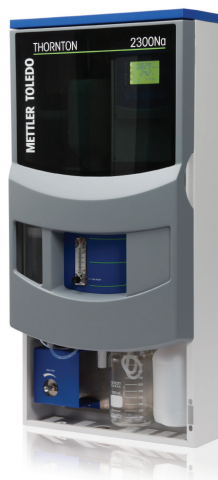
What does it mean, and how does it compare with alternatives?

While all Sodium Analyzers have processes to calibrate the electrodes, it is important to recognize differences among those processes and understand how fully unattended automated calibration works in instruments such as the METTLER TOLEDO Thornton 2300Na Sodium Analyzer. Fully unattended, automated calibration saves time and operator cost, while ensuring repeatable calibration results without human error.

While some instruments claim to be automated, the operator has to physically initiate several steps in the process. In this note we compare the calibration processes of leading analyzers currently in use.

Fully Unattended, Automatic Calibration

The 2300Na Sodium Analyzer features a fully unattended, automated calibration process. Once the calibration standard bottle has been installed at startup or after refill of the bottle, the operator



does not have to be present at all for the calibration after setting up the auto-calibration feature. Here are some key advantages:

- Fully automated calibration is provided, with no operator involvement in any step of the process. This saves time, operator cost and ensures that the calibration results are repeatable as well as free of human error.
- The operator can program a timer in the analyzer to start the auto-calibration process at any interval they require. The analyzer will then automatically calibrate at that set interval, and store the calibration results for subsequent measurements. The operator does not have to even go to the analyzer to start the calibration once this timer has been set.
- The analyzer conditions the sodium electrode inside the measurement chamber. The operator does not have to take it out of the analyzer to condition it every time a calibration is done.
- The electrodes do not have to be taken out of the analyzer for the calibration or conditioning. This results in less chance of the electrode being damaged while handling it.
- The operator does not have to buy and maintain equipment like pipettes to conduct the calibration.

"Automatic" Calibration

Some analyzers claim to have auto-calibration, however, there are key differences between their calibration process and the fully unattended automated calibration process described above.

- The operator has to remove the sodium electrode to etch it before every calibration. This is a manual process, and increases the risk of damaging the electrode while handling.
- The operator has to initiate the calibration process instead of using a timer-based fully automated process.
- The operator has to set up the calibration standard manually and start the calibration by pressing a button on the analyzer.
- Having to manually start the process and set up the calibration standard requires the operator to repeatedly come back to the analyzer throughout the calibration process to move from one step to the next.

As seen from the process description above, the calibration for this type of analyzer is actually semi-automatic at best since the operator has to be present to move the process from one step to the next.

Manual Calibration

Some analyzers use a fully-manual calibration process with the following steps:

- The operator must remove the sodium electrode from the analyzer to etch the electrode membrane before every calibration.

This increases the risk of damaging the electrode while handling.

- The operator must use a pipette to add standard solution for the calibration. This leads to an increased risk of a bad calibration result due to possible pipette tip contamination, improper pipette operation, mix-up in standard additions, etc. A bad calibration requires repetition of the whole process to correct it or produces erroneous measurements afterwards.

For a manually calibrated analyzer, as seen above, the operator has to be extensively involved in the calibration process. This results in higher operator cost as well as higher risk of incorrect calibration.

Calibration Choice

The various approaches to calibration and their capabilities are summarized in the table below. In selecting a Sodium analyzer it is important to understand exactly how the calibration is performed, how much operator involvement is required and how reliable the calibrations will be. The word "automatic" may be used to describe functionality that is less than expected. Examine specifications carefully.

	Full Unattended, Automatic Calibration	"Automatic" Calibration	Manual Calibration
Electrode conditioning/etching	Auto	Manual	Manual
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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