



An automated solution to the Kappa number test by titration

The delignification of woodchips during the krafting process in a pulp mill is the main quality parameter for the pulp. Kappa number is the variable that represents how much of the lignin, which is the binding element in the cellulose fibers, has been removed or degraded. The higher the Kappa number, the higher the bleaching chemicals cost. A low Kappa number means damaging the cellulose fibers which affects pulp yield and strength. Because of its importance the Kappa number must be routinely monitored.

There are different ways of testing for Kappa number. Many of the pulp mills in the industry have online analyzers. However, these analyzers must be verified or “spot checked” to verify performance. In order to perform this verification, the TAPPI T236 method for determining Kappa number is commonly used. For some pulp mills, the titration is the only available mechanism for measuring the Kappa number. The TAPPI T236 method is lengthy and sensitive to variations in analytical technique. There are critical steps in the procedure such as temperature measurement after a specific amount of time, reagent additions at a rapid rate, and others if not executed properly that could yield an inaccurate result. The method itself is validated and has been proven, however it is up to each operator to properly execute the method. This can be challenging considering the many responsibilities each operator has on a daily basis.

One way to improve the accuracy for a titration method and improve precision and consistency is to automate the process. The difficulty with the Kappa number test is that there are many steps in the procedure before titration occurs. A Multi-Tasking Titration System or Multi_T has proven to be successful in accomplishing this task.

The Multi_T is a PC controlled titration system that allows for simultaneous tasks to be performed. It consists of a passive interface that houses electrode inputs connected up to digital burettes which perform the reagent addition. The brain of the system is software on a PC which is what allows for Kappa number test to be executed according to the TAPPI method. Reagent additions, temperature measurements, wait times, titration parameters, and calculations are programmed into the software. Simply push the start button and the procedure is automated from start to finish. Multi_T runs through the entire process without operator intervention, thus eliminating the variability in results seen from operator to operator. Worker safety is also improved because there is no longer a need to frequently handle reagents.

The Multi_T system has been successfully integrated into several pulp and paper companies. References are available upon request.

In summary, the advantages of automating the Kappa number process are the following:

- ✓ Follow Tappi Method T236
- ✓ Improved process efficiency
- ✓ Results are more accurate, precise, and reproducible
- ✓ Ease of use
- ✓ Improved worker safety

The Multi_T can also be used for the ABC, Black Liquor, and Chlorate Residual test methods.

For more information regarding this solution, contact Lab Synergy at (866) 435-7897.