

EVALUATE THE WASHING PERFORMANCE METHODOLOGY

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ABSTRACT

In the pulp and paper industry, there is growing pressure on the factory washing equipment, either due to increases in production, with the equipment working at or above its maximum nominal capacity, or due to the tendency to reduce the use of water. On the other hand, the brown stock washing step is crucial to the chemical recovery cycle, as well as for bleaching and chemical consumption. The more efficient the washing is – less carryover is generated –, more solids will be recovered and consequently, with improved washing, lower the consumption of oxidants in bleaching. In this way, it is mandatory to know the condition of the washing equipment to guarantee its good performance and to optimize it.

Methodologies for evaluating washing efficiency are widely known in the industry, however many implemented methodologies are associated with determination errors and are time consuming. To optimize the washing efficiency evaluation methodology, Raiz combined the best available methods to minimize systematic errors and rapidly provide the required outputs, evaluating washing equipment more efficiently and accurately.

To test the optimization of proposed methodology, several samples were collected – washing liquid, filtrate, inlet and outlet pulp – from different brown stock washing equipment. In all the collected samples, the consistencies, and dry contents, solids content of the liquid that accompanies the pulps, of the washing liquor and filtered liquid were determined.

The consistencies were determined on the pulp samples as they were collected, these values were corrected with the solids content measured in the liquid leaving with the washed pulp. It was verified that these correction presents similar values to the consistency of the pulp washed until exhaustion, that is, without washable solids, allowing to obtain values eliminating the washing step.

To determine the solids, a new methodology and equipment were implemented, the measurement of total dissolved solids (TDS) by means of a portable refractometer, which makes it possible to determine solids instantly and at any place. Before implementing the refractometer, the correlation between the TDS measured by the equipment vs. conventional methods showed high values of determination coefficients, indicating that the refractometer is an effective method in the determination of solids of different liquids in the brown stock.

The correlation between TDS and chemical oxygen demand (COD) was reinforced, allowing COD values to be obtained in seconds when measuring solids in the refractometer. Additionally, the impact of different sample preparations for COD was verified, in which the risk of using inadequate COD values was evidenced. Since for the evaluation of the washing efficiency we only intend to measure the washable COD, however, some of the methods used quantify the COD bound to the fiber and within the fiber, in addition to the washable COD.

Finally, the typical washing efficiency parameters were calculated: displacement ratio, washing efficiency, dilution factor, norden efficiency and normalized norden efficiency.

It was possible to verify the effectiveness of this optimization of the washing efficiency evaluation method, managing to respond to the fiber line washing characterization in a short period of time and using few human resources.

Keywords: brown stock, COD, total dissolved solids, portable refractometer, washing efficiency.