knowledge transfer and dissemination

SP 6

training AND DISSEMINATION

Reduction of fresh water consumption by destabilisation and removal of contaminants with dissolved air flotation

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| DESCRIPTION AND SPECIAL FEATURES |

Reduction of fresh water consumption is an important issue in whatever manufacturing process due to different reasons: the more and more restrictive environmental legislation, the high prices of the water, the lack of water resources, process advantages, etc.

Closure of water circuits produces the accumulation of contaminants which can alter both the manufacturing process and the quality of the final products. Dissolved and colloidal contaminants are specially difficult to remove by conventional treatment technologies and may limit the degree of closure of the circuits. Advance separation technologies are feasible for these types of substances but they are usually very costly.

This technology is based on an improvement of the traditional dissolved air flotation units (DAF) and involved the destabilisation of these contaminants by the use of specific chemical products, optimised based on a focused beam reflectance probe (FBRM), and their latter removal in the conventional DAF unit.

The destabilisation of the contaminants, especially those present in dissolved and colloidal form, is specific for each type of water and for the contaminants to be removed (Figure 1). The experience in the selection of the chemical products by the use of advanced technologies for monitoring the coagulation/flocculation process (Figure 2), allows us to determine, in a fast way, if the removal of the contaminant is possible and economically viable (Figure 3).

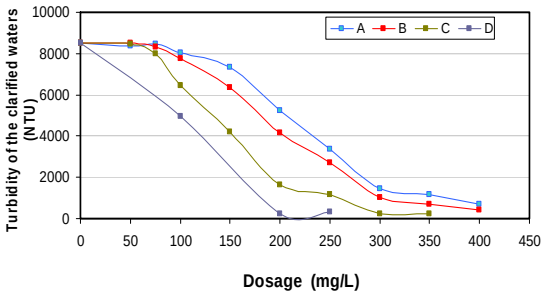

Figure 1.- Comparison of the efficiency of different chemical treatments for the removal of turbidity in a DAF unit for the treatment of process water from a paper mill.

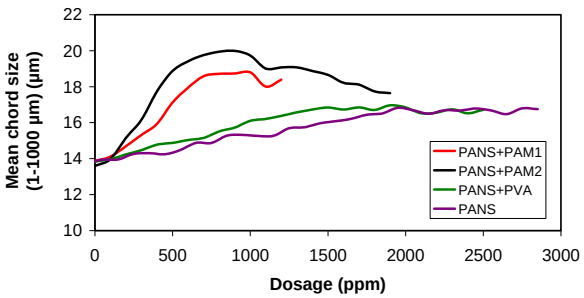

Figure 2.- Characterization of the efficiency on the flocculation of a process water from a paper mill by an aluminium salt (PANS) modified with different cationic polymers (PAM1, PAM2, PVA) with the FBRM methodology.

Figure 3.- Characterization of the efficiency of different chemical treatments in a lab scale DAF unit.

| INNOVATIVE ASPECTS |

The innovative aspect is the development of a fast methodology, based on a FBRM probe, to monitor and optimise on-line and in-real time the destabilisation of contaminants, especially those of dissolved and colloidal nature, which will be then removed by flotation.

This methodology allow us to optimise, at industrial scale, the DAF units with respect to the best chemical, the optimal chemical doses and DAF conditions to remove dissolved and colloidal material.

| COMPETITIVE ADVANTAGES |

The optimization of the chemical destabilisation of the dissolved and colloidal material in DAF units is of a great importance for an adequate cleaning of their water circuits, focused in the main specific contaminants which limit a further increase in the closure of water circuits. With the application of this technology, companies can reuse their process water and reduce significantly their fresh water consumption and, consequently, the discharge of effluent and its associated costs.

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