Improved Wastewater Treatment & Mill Performance with new COD monitoring Technology

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Mills worldwide are aggressively reducing their fresh water in-take in many cases targeting near to zero discharge. When reducing fresh water in-take there certainly are problems in circulation water reuse as well as in waste water treatment plants (WWTP). At mills the impact of dissolved organics, as measured by chemical oxygen demand (COD), can have a large influence on cost and performance. At the same time, environmental regulations for COD discharge are tightening, thus an appropriate online COD measurement method required.

In recent years a novel environmental friendly online dissolved COD measurement method, peCOD, with smart decision support system, has been developed. The peCOD method is Safe, Fast and Green eliminating the use of mercury, dichromate and concentrated acid. The peCOD results are generated in 15 minutes. The core of the peCOD technology is a UV-activated nanoparticle TiO_2 photocatalyst coupled to an external circuit. The powerful oxidising potential of UV-illuminated TiO_2 ensures that virtually all organics will be fully oxidized giving a true measure of COD. The peCOD offers a unique approach that overcomes many of the problems encountered by existing COD analysis methods.

In this study a comparison of COD results using peCOD and the standard dichromate method were conducted for many different effluents from both kraft and mechanical pulp mills. The studies were done in the laboratory as well as in full scale. The peCOD demonstrated a strong correlation to the standard dichromate method for all of the effluent samples and indicated excellent reproducibility for comparative results.

In a full scale application, a Chilean Mill laboratory put a peCOD unit into production, thereby providing results to process engineers 2.5 hours faster than the dichromate method. This led to a reduction in hypochlorite used for bleaching with no loss of product quality, resulting in lower organics in the waste water plant with further reductions in chemicals and energy used for treatment. The total savings over 12 months netted $3 million dollars.

The peCOD has the ability to enable mills to improve effluent treatment processes and to optimize chemical programs, leading to proper chemical dosage (not over or under doses) and lower energy requirements for treatment. In terms of potential applicability at mills, the strong correlation between peCOD and the conventional dichromate method suggests that the peCOD could be a valuable tool to help both in-mill operation optimisation and improved waste water optimisation while protecting public health and the environment.