

# Pulp and Paper Applications with Environmental Impact

Environmental pressures coupled with the need to remain competitive in a marketplace that has become increasingly demanding presents a formidable challenge to today's papermakers. Environmental concerns are changing the way pulping and bleaching operations are run. Although concern for the environment is the driving force behind many of these changes, issues of productivity, quality, and efficiency must not be overlooked.

Significant projects are underway at many mills to address environmental concerns. Whether or not your mill has undergone upgrades and/or expansions for this reason, there are a number of areas throughout the mill where the AMETEK Model 4000 Photometric Analyzer can help you protect the environment and enhance performance.

## Brownstock Washing

Brownstock washer control is something that is often overlooked or does not receive adequate attention. Variations in the pulp stock are often significant due to variations in incoming pulp stock. These variations are, in turn, caused by any number of factors including the wood species mix, the chip quality and moisture content, and overall pulping conditions. The effects of fluctuations in the washing efficiency are felt in both the bleaching and the papermaking operations. The goal of brownstock washing control is to form and maintain a balance between competing requirements - maximizing the washing of the pulp and the chemical recovery, and minimizing the load to the evaporators. The environmental impact of brownstock washing should also be considered.

Brownstock washing separates the pulping and bleaching operations and, in most instances, brownstock filtrate is sent to the evaporators while bleach plant effluent must be handled separately. For this reason, the extent of washing the pulp undergoes can significantly affect the nature of the bleach plant effluent. If the pulp is not washed sufficiently, then there is excessive lignin carryover to the bleach plant. This excess lignin in the filtrate gives rise to increased bleach chemical usage needed to achieve a given brightness target, increased potential for the formation of chlorinated organics, and increased bleach plant effluent load due to the excess bleach chemicals required.

Continuous, on-line analysis with the Model 4000 allows for the optimization of washer efficiency while minimizing lignin carryover to the bleach plant. The Model 4000 directly measures the dissolved lignin in the brownstock washer filtrate. The uv absorption of the lignin in the filtrate provides a means to determine directly the lignin concentration. If the current means of brownstock washer control is based on the solids content of the filtrate, it is possible to continue with the strategy as the lignin concentration correlates to the solids content.

A fast responding analyzer in closed-loop control can help stabilize the process under upset conditions. The Model 4000 with its split beam technology provides an accurate and reliable signal that can be used, with confidence, for control. Traditional conductivity measurements may not provide the reliability for the control you need.

Environmental guidelines and restrictions vary from place to place but all environmental agencies are moving in the same direction - to further restrict and regulate emissions. Both the number of chemical species and the degree to which each is being restricted has increased. One area of particular concern is the emission of chlorine and chlorine dioxide to the atmosphere.

*continued on page 2*

*continued from page 1*

The AMETEK Model 4000 provides a cost effective way to comply with environmental restrictions either in the chlorine dioxide generation plant or in the bleach plant. Both chlorine dioxide and chlorine vapor emissions can be monitored and recorded with a single analyzer. It is possible to sequence between up to two sampling points with the Model 4000 photometric analyzer. Chlorine dioxide vapor can be measured down to a range of 0 to 5 ppm ±0.1 and chlorine vapor to a range of 0 to 100 ppm ±2.

## Chlorine Dioxide Residual

An aspect of papermaking undergoing tremendous change is pulp bleaching. For chemical pulp bleaching, there is a definite trend to either eliminate or significantly reduce chlorine use. Increasingly higher substitutions of chlorine dioxide in the first bleaching stage are becoming common. As a result of this increased chlorine dioxide use, many mills are chlorine dioxide limited.

Additional chlorine dioxide generating capacity requires major capital expenditure. However, more efficient use of the current amount of chlorine dioxide produced could allow for a higher chlorine dioxide substitution ratio in the first stage without compromising final pulp brightness. With on-line residual chlorine dioxide analysis using the Model 4000, it is possible to use the minimum amount of chlorine dioxide to achieve the target residual level. It is no longer necessary to use more chlorine dioxide than is required to ensure that the target residual level is maintained. Lab testing for residual levels is no longer necessary and the incidence of dips in the chlorine dioxide residual level below the target value is removed.

When the concentrations of bleach chemicals are known and the minimum amounts are used, there are a number of benefits achieved: reduced environmental impact, reduced effluent load, and lastly, pulp of higher and more consistent quality is produced. Continuous, on-line residual analysis with the Model 4000 provides a means to use chlorine dioxide most efficiently and to increase the uniformity and overall brightness level of pulp.

## Effluent Color & Turbidity

With the renewed focus on the environment, local environmental agencies are tightening their requirements on acceptable color and turbidity levels in effluents. As color measurements may be influenced by turbidity present in the effluent stream, a reliable and accurate instrument is essential. A color measurement that does not consider turbidity in the effluent stream will give an artificially high color reading, for example.

The split beam technology of the Model 4000 ensures that turbidity does not interfere with the color measurement. The modular construction of the analyzer allows for a variety of cell lengths which permits the highest measurement sensitivity. Both the color and the turbidity measurements are made simultaneously on the same effluent sample. The Model 4000 photometric analyzer provides highly sensitive and accurate measurements of both high color and turbidity with a single instrument.

AMETEK®
PROCESS INSTRUMENTS

455 Corporate Blvd., Newark DE 19702
Ph. 302-456-4400, Fax 302-456-4444
**www.ametekpi.com**

REGISTERED ISO 9001 MANAGEMENT SYSTEM


EnvImpact (06/05/07)

*Specifications subject to change without notice.*

***SALES AND MANUFACTURING:***

**Canada - Alberta**
2876 Sunridge Way N.E., Calgary AB • Tel: 403-235-8400, Fax: 403-248-3550

**USA - Oklahoma**
2001 N. Indianwood Ave., Broken Arrow OK 74012 • Tel: 918-250-7200, Fax: 918-459-0165

**USA - Pennsylvania**
150 Freeport Road, Pittsburgh PA 15238 • Tel: 412-828-9040, Fax: 412-826-0399

***WORLDWIDE SALES AND SERVICE LOCATIONS:***

**USA -** Texas
Tel: 281 463 2820, Fax: 281 463 2701

**CHINA**
Beijing / Tel: 86 10 8526 2111, **Fax: 86 10 8526 2141**
Chengdu / Tel: 86 28 8675 8111, Fax: 86 28 8675 8141
Shanghai / Tel: 86 21 6426 8111, Fax: 86 21 6426 7818

**FRANCE**
Tel: 33 1 30 68 89 20, Fax: 33 1 30 68 89 29

**GERMANY**
Tel: 49 21 59 91 36 0, Fax: 49 21 59 91 3639

**MIDDLE EAST -** Dubai
Tel: 971 4 881 2052, Fax: 971 4 881 2053

**SINGAPORE**
Tel: 65 6484 2388, Fax: 65 6481 6588