

## NALCO WATER'S EXPERTISE IN ADVANCED TISSUE MACHINE TECHNOLOGIES

Nalco Water is committed to providing innovative solutions that meet current and tomorrow's demands in the Structured Sheet Tissue industry for TAD and NTT type machines.

Nalco Water's integrated approach brings together an innovative portfolio of programs, on-site expertise, advanced monitoring technologies and automation for Structured Sheet Tissue Machines to meet your specific goals in start-ups and conversions at optimized total cost of operations.

**NALCO**  **Water**  
An Ecolab Company



## NALCO WATER INNOVATION DELIVERS VALUE TO THE TISSUE INDUSTRY

Nalco Water is firmly committed to the Tissue industry. We partner with Tissue and Towel producers worldwide to deliver economic and environmental value through our reliable, cost-effective and safe solutions. Our goal is to deliver a measurable return on investment.

## INTRODUCTION

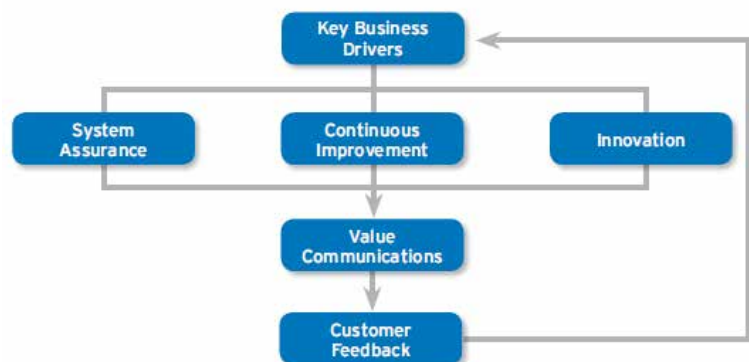
Our approach sets us apart. With an unparalleled commitment to personally delivered service and a suite of innovative technologies and science-based solutions, we drive positive economic and sustainable impacts through our customers, operations and the communities in which they operate. Our solutions help customers achieve ambitious business and environmental goals. We deliver exponential outcomes that benefit customers and communities. Fundamental to our approach is an understanding that real and lasting change is accelerated when economic and environmental benefits align. We start with what matters most to our customers—performance—and link performance outcomes to environmental and social metrics and cost savings to demonstrate the triple bottom-line benefits of sustainability.

It's why so many tissue professionals choose Nalco Water as their partner for structured sheet assets. These assets present unique challenges, particularly in the Yankee coating and fabric release operations. Nalco Water specializes in these complex operations and start-ups and considers all the necessary details. Because of our extensive experience and commitment to excellence, we have a proven track record helping mills meet and exceed their performance and quality goals with a portfolio of tested and proven innovative technologies and platforms.

## CMV

We adopt a grade-based approach to understand and address the unique needs of each industry segment: board & packaging, fiber, graphics, and tissue.

Using our CMV (creating & maintaining value) process, our local account team works closely with you to understand and prioritize your needs/objectives. We work with your technical and operations personnel to develop a service and improvement plan to deliver maximum performance from your existing applications. We leverage industry experts, processes and technologies in a manner that is tailored to your operations and key business drivers.



## INNOVATIVE SOLUTIONS

At Nalco Water, we gain considerable insight from our customers- the challenges they face and the results they want. This knowledge drives our innovation.

The success of our innovation is evaluated by how well our solutions support the goals of our customers. Nalco Water's recent investment in permanent wet strength programs and expanded Yankee coating technology, has further enabled us to deliver complete mill wide solutions for tissue producers.

We take a Total Impact Approach to innovation. We look holistically at the environmental, economic and social impacts of our products and service offerings, considering how each solution increases efficiency, minimizes the use of natural resources and improves safety- from sourcing to manufacturing to use and through disposal.

## NALCO WATER INNOVATION IN STRUCTURED SHEET, AUTOMATION, AND CHEMISTRIES

Based on our broad experience, in liaison with our customers and machine vendors, a partnership can be developed to achieve a rapid and sustainable learning curve of the machine operations or on a new machine start-up.

A partnership with Nalco Water helps support the customer and relieves the day-to-day stresses of managing one of the biggest industry challenge, of daily machine operations and or start-up of a new Structured Tissue machine. Nalco Water has a team of global experts, with personally delivered service, innovative technologies and science-based solutions, to drive positive economic and sustainable performance, enabling customers to produce quality products and meet their strategic goals.

The partnership allows Nalco Water to fully discover and understand the mill's specific technical requirements. Nalco Water has experience with all types of tissue machines, including through-air drying (TAD) systems, hybrids (NTT/ QRT/ATMOS), and conventional tissue machines.





## RD&E CAPABILITIES, KNOWLEDGE, AND LAB TESTING

Ph.D. researchers and technicians are thoroughly trained in tissue and towel testing and analysis. Their extensive experience includes operation of state-of-the-art instrumentation and sample analysis. Our analytical labs are ISO 9001:2008 certified. Standardized, documented procedures help assure accurate answers. Our network of Nalco Water labs service customers around the globe.

You can rely on us for comprehensive answers over a wide range of areas. While many development labs perform water analyses, few also have capabilities for deposit, ion exchange, metallurgical, and fiber and paper testing. Even fewer have the global network of Nalco Water expertise ready to help you. Count on us for insight that can help you and your Nalco Water field representative troubleshoot problems. You will get the answers you need, quickly.

## NALCO WATER TISSUE LAB TESTING CAPABILITY INNOVATION IN CHEMISTRIES

NCAT crepe structure analysis

Confocal Laser Scanning Microscopy (CLSM) characterization of tissue surfaces

TSA – Tissue Softness Analyzer (Emtec)

Tissue Caliper by Soft Platen

Traditional Tissue Testing Laboratory

Yankee Coating and Film Evaluations

Polymer Characterization such as Molecular weight, Charge density, Composition by NMR, IR, MALDI and Thermal properties by DSC and TGA

Other Techniques and Capabilities including SEM, AFM and Rheology



Tissue makers face the challenge of meeting many consumer demands on end-product performance. Our approach takes this into account, and impacts all aspects of tissue and towel production, from managing finished product properties to the resources used in their manufacture. We incorporate mechanical, operational and chemical elements that enable you to run machines faster, cleaner and with fewer breaks.

In addition, we understand the unique characteristics of coatings, the critical role they play in the creping process, and how under close management, they can produce a stronger, softer tissue.

## AUTOMATION

### Tailored Creping Process



**Coating Space Model** is the proper balancing of additives on the Yankee surface to achieve the desired sheet characteristics of the tissue or towel, and to maximize machine runnability.

- Enhancing the coating attributes based on the operating conditions
- Adapting sheet characteristics in both softness and bulk

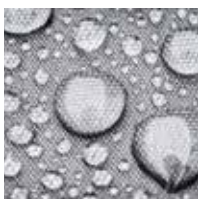
### Durable & Soft



**DuraSoft™ creping technology** has been formulated to improve creping efficiency while withstanding the challenge of moisture variation. This solution combines durable yet soft film generation with process knowledge to improve final product quality and productivity.

- Improving machine runnability
- Reducing edge deposits and chatter potential

### Microbial Control & Monitor



**OxiPRO™ Technology for Deposit Control** combines Nalco Water's proprietary tools, individually tailored chemistries and local application expertise to proactively monitor and control microbial deposits. With wet-end compatibility, this solution maximizes machine efficiency, improves operational safety, protects the machine asset and reduces total cost of operation.

- Maximizing machine efficiency
- Real-time monitoring of biocide program

### Softer & Stronger Sheet



**TULIP creping technology** is a formulation of unique chemistries working in combination with service and monitoring tools. This program has been specifically designed for delivering softer tissue with energy and cost efficiency.

- Improving machine efficiency and sheet attributes
- Reducing energy and fiber cost

### Sheet Strength Enhancement



**METRIX™ strength technology** combines Nalco Water's unique chemistry with process knowledge to improve productivity and product quality by enhancing press dewatering and sheet strength

across all paper grades.

- Meeting strength targets
- Using lower quality recycled fiber

### Strong Wet-end Performance



**HYBRID™ technology**, in conjunction with PARETO mixing technology, enables papermakers to attain important on-machine-efficiency (OME) and sheet quality gains in formation, porosity and smoothness. Designed for performance,

this new technology provides controllable drainage in high-speed machines, and improves ash/fines retention to complement existing programs without hurting formation.

- Maximizing retention, drainage and stickies control performance
- Reducing total cost of operation and environmental impact.

The Nalco Water Automation team has developed a suite of new sensor and automation tools developed by our RD&E experts and our technology partners to provide tissue makers in-depth knowledge and valuable insight into their unit operations. These tools are designed to assist tissue makers in delivering consistent product quality, improved machine efficiency and extended asset availability while reducing fresh water consumption.

### Consistent & Fast



**Crepe Analysis Toolbox (NCAT) technology** is an offline, compact and robust sheet imaging sensor. This innovative device provides tissue makers with a powerful, quantitative management tool to improve operation

and cost performance.

- Rapid crepe structure measurements
- Improving product development and optimizing process

### Reduce your Chatter



**Early Warning Chatter Detection (EWCD) technology** is an integrated solution for monitoring creping blade vibration. It provides tissue makers with real-time information on vibration behavior and greater insight into overall

performance of the creping process.

- Early warning of potentially harmful chatter events
- Improving asset reliability and protection

### Detect, Determine, Deliver



**3D TRASAR™ technology** is Nalco Water's integrated approach to water treatment, delivering optimized, cost efficient and sustainable solutions to provide peace of mind. Combining Nalco

Water's unique chemistry in real-time monitoring tools enables a quick response to cooling water, boiler and reverse osmosis (RO) system problems, helping reduce total cost of operation.

- Saving water, energy and material
- Providing asset protection and plant reliability

### Reuse & Recycle

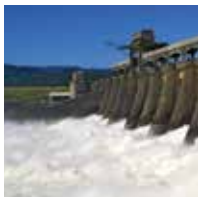


**3D TRASAR™ technology for DAF** is a new proprietary monitoring and control solution for dissolved air flotation systems. This solution consistently produces high quality effluent that can be

reused in the process application rather than discharged to the waste water treatment (WWT) plant.

- Saving water, energy and material
- Improving operational efficiency, while reducing environmental impact

### Optimal Mixing & Delivery



**PARETO™ mixing technology** is a new proprietary feeding solution that increases process stability and saves fresh water and energy, by optimum mixing of chemicals into the process.

- Increasing process stability
- Maximizing chemical efficiency



### Case 1: NTT machine

Tulip Creping Technology and Early Warning Chatter Detection (EWCD) improve productivity, protect vital assets and save energy consumption

- Grade: 100% Recycled Away-from-home Bath Tissue
- Machine Type: NTT
- Machine Speed: 6300 fpm
- Production: 117TPD
- System pH: Neutral
- Furnish: 100% Recycle

#### EROI SAVING:

By using Tulip Creping Technology and EWCD, this tissue machine's speed, was increased by 26% resulting in a \$800,000/year profit from increased production.

18mm BTU/day savings, resulted in a \$42,000/year savings.

Proactive Yankee Chatter prevention, resulted in Yankee Dryer asset protection



PRODUCTIVITY



ENERGY



ASSET PROTECTION

### Case 2: 3D TRASAR™ for DAF | Tissue

Tissue mill reduces fresh water use by 36 million gallons/year using 3D TRASAR™ Technology for Dissolved Air Flotation

- Grade: 100% Recycled Away-from home Bath Tissue and Kitchen Towel
- Machine Type: Crescent Former
- Production: 108TPD
- Furnish: 100% Recycle
- System pH: Neutral

#### EROI SAVINGS:

3D TRASAR for DAF, reduced fresh water consumption by 16% for this tissue mill; from over 235 million gallons/year to 198 million gallons/year, resulting in \$535,000 in annual savings.

By using 3D TRASAR for DAF, this tissue mill met their environmental water usage, and continued their permit to operate.



WATER



WASTE

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