

METRIX™ Technology for Strength and Productivity Provides Towel Manufacturer With New Capability to Drive Cost and Product Initiatives

Mill Overview

Equipment:	TAD Machine
Production:	160 Tonnes per Day
Machine pH:	Neutral
Furnish:	100 Percent Virgin Refined Softwood
Grade:	Towel

BUSINESS SITUATION

A North American towel manufacturer was challenged with numerous cost and grade development objectives. These objectives took aim at reducing chemistry cost, improving product absorbency, and developing stronger grades.

In pursuit of these objectives, mill management did not want to pursue the costly path of alternative fiber supplies, increased basis weight, or increased refining levels. The mill technical group was left with limited options, with

chemistry identified as a potential means for improvement. However, the full potential of their two component strength program had already been realized through prior optimization efforts. Moving forward, it was understood that a different approach to strength chemistry was needed to address the mill's key business drivers.

The machine's primary grade was a 16 pound towel with a dry GMT target of 3,900 g/3 and a wet:dry ratio target of 30 percent. Centerline strength chemistry add-ons were 14 lb./T (6.4 KG/T)

CUSTOMER IMPACT

50 percent reduction in total strength chemistry dosage on primary grade
Wet strength reduced 7 lb/ton
Dry Strength 2 lb/ton



Maintained current refining levels on high strength grade
At \$5/MMBtu, savings reduction of 9,000 MMBtu/yr



ECONOMIC RESULTS

\$15 per metric tonne savings resulting \$400,000 in annual savings

Avoidance of \$20,000 per year in increased energy burden

Avoidance of \$40,000 per year in increased natural gas burden

Electricity \$15K/yr = 1 HP-day/T x 150 T/day x \$400/Hp-yr x 90 days/yr. x yr./365 days

of wet strength resin and 4 lb./T (1.8 KG/T) of anionic dry strength resin on the grade.

ANALYSIS OF BUSINESS SITUATION

Mill management outlined the following objectives for the customer's technical group, with strong emphasis on maintaining current fiber supply, refining level, and basis weight target. The objectives included cost and performance improvement to the machine's primary grade as well as capability development to manufacture higher strength grades.

Key Drivers

- **Reduce overall chemistry cost.** The technical group was directed to deliver a significant reduction in chemistry cost on its primary grade for the machine. In today's marketplace, it is the case that manufacturers are under constant pressure to reduce their primary costs: energy, fiber, water, and chemistry.
- **Improve absorbency.** Market analysis showed that the primary grade's absorbency rate fell short of competitive brand results. With absorbency being a critical characteristic in customer use, it was imperative that the performance issue be addressed.

- **Develop stronger grades.** This mill location had an opportunity to expand business/volume if basesheet at higher strength and higher wet:dry ratio could be developed. Grade development also played a continuous role in the manufacturer's pursuit of increased volume and profit.

Challenge/Opportunity

- Maintain current fiber supply, basis weight, and refining level. Both alternative fiber supplies and increasing basis weight would translate to a heavy financial burden, while increased refining levels would lead to increased energy demand and a further reduction in absorbency.

Program Design

The local NALCO Water team recognized that the potential of existing strength chemistry programs had already been realized through prior optimization, and it was understood that increasing add-ons did not translate to increasing capability. The NALCO Water engineer assigned to this project shared their experiences related to a new technology in the NALCO Water METRIX technology

product line. NALCO Water METRIX 64103 technology is a patented cationic wet and dry strength additive, which can be used in combination with conventional wet and dry strength resins, providing capability above and beyond the standard two component approach. Prior applications have shown that the addition of this latest application of METRIX technology provides the following benefits to manufacturers:

- **Cost Improvement** - METRIX technology provides tissue and towel manufacturers the ability to reduce total strength chemistry add on up to 50 percent at same furnish/refining, resulting in a significant reduction in spend to the manufacturer.
- **Strength Capability** - METRIX technology provides papermakers the ability to significantly increase both total tensile and wet:dry ratio at neutral/favorable cost conditions.
- **Wet End Stability** - High dosage of conventional wet strength resin often results in an iso-electric or cationized state in the machine wet end, commonly resulting in poor formation and poor wet end stability. METRIX technology allows for significant reduction of such resins, mitigating the undesirable side-effects associated with the conventional strength approach.

- Absorbency Improvement -**
 By providing the manufacturer with the ability to reduce the conventional wet strength resin dosage, commonly in excess of 10 lb/T, METRIX technology allows the unique capability to improve absorbency rates, a critical attribute in product performance.

KEY PERFORMANCE INDICATORS

- Reduce current chemistry spend on primary grade.
- Improve absorbency on primary grade.
- Develop capability to manufacture higher strength grades.

PROGRAM RESULTS

The new METRIX technology was fed to the thick stock (after the wet strength resin, before the dry strength resin). The NALCO Water production team was able to deliver the following results against the previously stated objectives. Additional program results are illustrated in Table 1.

Table 1 - Before METRIX (baseline) and after METRIX (improved) addition conditions for the associated additive usage rates

	Baseline	Improved
Total	18	9
Wet Strength Resin	14	4
METRIX - 64103	0	4
Dry Strength Resin	4	1

- Cost Improvement -** METRIX technology allowed the manufacturer to reduce total add-on by 50 percent on their primary grade. This reduction translated to a \$15 per metric tonne savings, or annualized savings of \$400,000/year. A comparison of chemistry add-ons in pounds per metric tonne for the baseline and improved condition is provided below.
- Grade Development -** METRIX technology provided the manufacturer with the ability to increase GMT by 10 percent, from 3,900 to 4,300 g/3, while improving their wet:dry ratio four percent, from 30 to 34 percent. These results were delivered at a \$5 per metric

tonne savings in strength chemistry versus the baseline dosage on the primary grade provided above. Furthermore, the customer was able to avoid other costly options related to fiber, basis weight, and refining.

- Absorbency Improvement -** METRIX technology allowed the manufacturer to improve the absorbency rate in the primary grade by 25 percent. The improvement was consistent across all grades achieving a significant reduction in conventional wet strength resin.

Working together, the customer and NALCO Water were able to implement a unique chemistry and tailored solution to what have become the everyday challenges in today’s manufacturing environment. NALCO Water METRIX 64103 technology, the newest METRIX offering, delivers new capabilities to tissue and towel manufacturers looking to improve their products and profitability.

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