

BrainWave

Control solutions for industry



The challenge: To control your plant so that it runs at peak efficiency



The solution: Measure. Control. And profit.

In today's economic climate, your facility faces more challenges than ever before. Your plant must run at optimal performance. Product consistency is a must. And utility and chemical costs must be kept to a minimum to maintain profit margins. That's why ANDRITZ AUTOMATION offers a portfolio of advanced control solutions—BrainWave—for industrial operations.

These solutions are revolutionizing control at plants around the world, helping producers large and small remove bottlenecks, reduce

energy and chemical consumption, produce higher quality products more consistently, and lower production costs—all of which result in significant savings.

Historically, advanced process control technologies have been deployed only at large scale petrochemical plants where the high cost of implementation and maintenance could be supported.

BrainWave will change the way you think about advanced process control. This patented controller can be implemented quickly. It is robust and stable, and is used by operators continuously. With BrainWave, ad-

vanced process control can now be applied in an effective and economical manner in a wide variety of industries.

Don't see your solution listed? No problem—our control experts not only implement our solutions, but can audit your operation and devise a custom control strategy for you.

"I haven't touched my BrainWave controller since we installed it seven years ago and it is used all of the time by our Operators."

Tom Barker, DCS Manager
FMC Phosphates, Green River, WY

What is BrainWave?

BrainWave is a patented advanced controller that outperforms conventional Proportional-Integral-Derivative (PID) control. BrainWave outperforms PID systems because of its two main components: an adaptive model and a predictive controller.

BrainWave builds its own live models during normal plant operations, a powerful feature not offered by conventional Model Predictive Control systems.

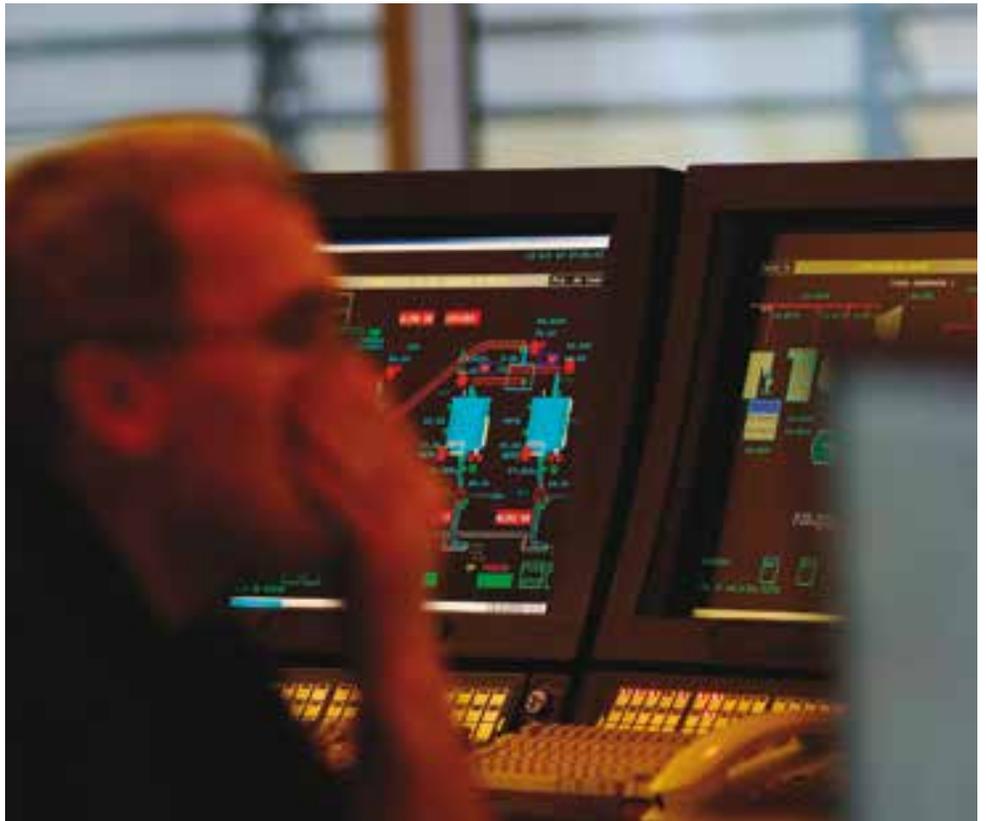
BrainWave's predictive controller accurately forecasts process responses and accounts for multiple objectives. It adapts to process conditions such as changes in production rate or operating point, keeping your process on target. BrainWave can also accept

Feature	PID	BrainWave
Controls long dead-time processes	x	✓
Reacts before being pushed off-target	x	✓
Handles nonlinear processes	x	✓
Adjusts to process disturbances	x	✓
Learns while process is running	x	✓

measured disturbance inputs, like raw materials properties, and takes corrective action before your process is pushed off target (PID, by comparison, must wait for the error to occur, then react).

Because it uses a standard OPC connection, BrainWave easily integrates with an existing control system. In addition, BrainWave's pat-

ented Laguerre technology means an average implementation time of just a few weeks, saving a remarkable amount in operating costs compared to conventional methods. Best of all, your own staff can support and deploy BrainWave, making it a technology that you can live with—and one you can't afford to live without.



The challenge: To fully stabilize and optimize your processes

The solution: BrainWave advanced control

ANDRITZ AUTOMATION offers a complete suite of BrainWave solutions for industrial operations, with the features described below.

Reduced variability

BrainWave has been proven to reduce variability from 30% to 95%. This allows for more consistent production and products and reduced operating costs.

Guaranteed results

BrainWave projects include a performance guarantee to ensure results are achieved. All costs are known and defined in advance.

Rapid deployment

In most cases, the initial results of BrainWave are obtained in just a few weeks.

Easy connection

BrainWave easily connects to existing control systems and allows migration to new systems. In addition, BrainWave can be used



across an enterprise in which a customer may own a variety of DCS components from various suppliers.

Reporting

ANDRITZ AUTOMATION offers full reports on the results of BrainWave, including economic benefits obtained, additional benefits realized, and opportunities for further improvement. ANDRITZ AUTOMATION pro-

vides solutions for all areas of a manufacturing operation where more stable operation is desired.

If you have a specific need that you do not see covered, be sure to contact our sales staff.



Benefits

- Remove bottlenecks
- Reduce energy use
- Produce higher quality product
- Easily integrate with existing control systems
- Usually deployed within a few weeks

Achieve full optimization with Advanced Control Expert

Once you have achieved outstanding success stabilizing your process with BrainWave, you can take your operations to the next level with Advanced Control Expert (ACE).

ACE is an automated “expert operator” that works in conjunction with the BrainWave solution to fully optimize a process. The expert operator in ACE is always at full attention, never distracted, and achieves optimum conditions for your mill.

BrainWave makes sure your process gets to set point and stays there. But how do you know if you have the best set point to run your process? Which set point will help you save the most energy? Will changing the set point improve your product quality? Will it help you save money?

That’s where ACE comes in. Once BrainWave has stabilized your process, then ACE can be implemented to determine the best set points, so that the process can operate at maximum efficiency.

Unlike the “black box” solutions offered by others, ACE communicates to the operators in their native language, advising them about changing strategies and goals, constraints, and operational issues.



Feature	ANDRITZ	DCS Vendor	Brand X
Advanced regulatory control	Always	Sometimes	No
Learning feedforwards	Always	No	No
Solutions hard-coded in DCS, dependent on programmer skill for success	Never	Yes	Yes
Black box supervisory layer	Never	Yes	Yes
Common structure for all solutions to minimize training time	Always	No	No
Best possible solution/excellent uptime	Yes	No	No

Advanced control success stories

Customer: Veracel Celulose S.A.

Control objective:

- Reduce moisture variability
- Stabilize operations
- Control system: Foxboro IA

One of the largest pulp dryers in the world can be found at Veracel, a state-of-the-art pulp plant, located in Eunapolis, Brazil. Veracel Celulose implemented the BrainWave advanced controller to improve efficiency of their 3,000 t/d eucalyptus pulp dryer.

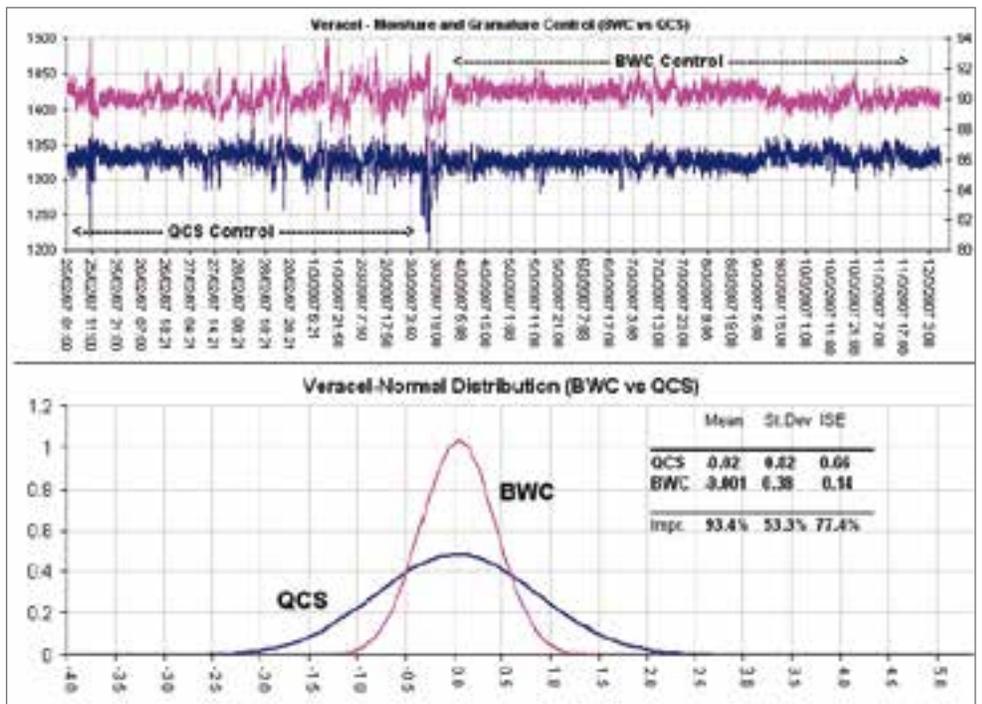
BrainWave was deployed within two weeks and the results were seen immediately. Full automatic operation was achieved, decreasing operator workload and helping the dryers stabilize faster after start-up and during production rate changes.

With BrainWave, moisture variability was reduced by 75% to 85%. "The pulp dryer immediately stabilized and BrainWave was accurately controlling moisture and basis weight," said Walter Martins, Technical Director of Veracel. "There was no question the performance was much better. We have never seen our dryer operate so smoothly."

Rubine Gouveia, Advanced Control Project Leader for Veracel, added, "I have been part of other advanced control projects, but never ones that provided such great results so fast. I am amazed; I expected this to take months."



BrainWave (BWC) versus original control (QCS) at the Veracel dryer (March 2007) ▼



Customer: Consumers Glass

Control objective:

- Increase production
- Reduce scrap
- Reduce job change time

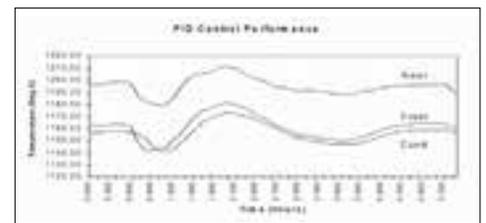
By implementing BrainWave, Consumers Glass was able to achieve dramatic improvements in the forehearth at its plant in Lavington, British Columbia, Canada. In particular, Consumers Glass wanted to improve product quality, reduce scrap, and decrease down time between job changes.

“Forehearth 22-2 has about twenty job changes per month,” said Don Matovich of Consumer Glass. “The improved control with BrainWave saves approximately 43 hours a month or 533 hours a year of lost production due to the glass temperature not being stabilized at set point. This is about 6% of the annual production of forehearth 22-2.”

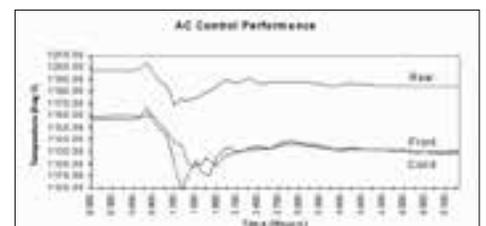
“Over the last two years of operating experience, the plant has observed an improvement



in the pack by 27% of standard pack for the most common containers produced on forehearth 22-2. Now that the second installation is complete, we expect a profit increase of approximately 500,000 USD per year.”



▲ Forehearth prior to BrainWave: The existing PID controls required hours to stabilize the forehearth temperatures after a job change.



▲ Forehearth with BrainWave: With BrainWave, the same job change is rapidly stabilized and the plant is once again producing excellent product quickly.

Automation solutions

Release your full potential



ANDRITZ Inc.

Atlanta, GA, USA

Phone: +1 (404) 370 1350

Australia: Melbourne | Austria: Vienna | Brazil: Belo Horizonte, Curitiba | Canada: Nanaimo, Prince George, Richmond, Terrace | Chile: Santiago | Finland: Kotka, Tampere, Varkaus | India: Bangalore | USA: Bellingham, Montoursville

www.andritz.com
automation-sales@andritz.com