



AUTOMATION
**CONTROL SOLUTIONS
FOR HYPERBARIC FILTERS**

BRAINWAVE HB FILTER

ANDRITZ

ENGINEERED SUCCESS

Reduce energy consumption by stabilizing control of your hyperbaric filters

The BrainWave HB Filter is a proven control system that stabilizes the operation of hyperbaric filters, resulting in improved control of the final product moisture and reduced energy consumption.

BRAINWAVE HB FILTER

BrainWave is a unique control package using patented model-based predictive adaptive control technology, widely used by many mining process areas.

One of the main issues in hyperbaric filter control is the over-drying of product, which can increase energy consumption. BrainWave accounts for transport delay times as product moves through the filter to the online moisture measurement sensor.

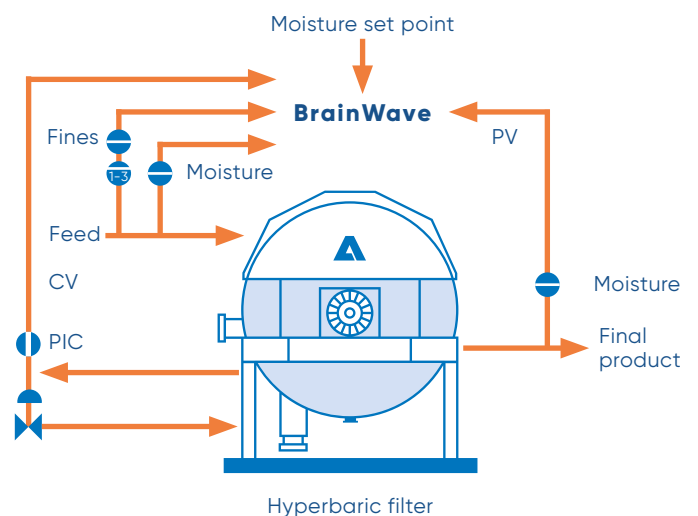
Further improvements to control are possible by monitoring incoming moisture content, either on- or offline, and including this in the control strategy as a measurable feed-forward. This allows BrainWave to make control corrections as soon as the incoming moisture changes, instead of waiting for the exiting moisture to respond.

BrainWave is also able to reduce spikes in air pressure, which cause increased wear and excessive maintenance on equipment. BrainWave accomplishes this by stabilizing the measured moisture content at the filter exit by continuously adjusting air pressure.

Variations in fines or particle size cause the filter dynamics to change dramatically—a scenario not addressed by PID control. BrainWave, however, utilizes the particle size distribution, either as an online measurement or as a laboratory input, to adapt the control automatically, further improving filter efficiency, reducing air consumption of the blowers.



MOISTURE CONTROL SYSTEM





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 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 patented Laguerre technology means an average implementation time of just a few weeks, saving a remarkable amount in operating costs compared to conventional methods. And, 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.

PID CONTROL VS. BRAINWAVE

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	✓

BENEFITS

- Improve energy efficiency through tighter moisture control
- Achieve optimal product moisture through tighter automatic control of pressure responses
- Reduce equipment maintenance by minimizing excessive pressure variations





WHY WORK WITH ANDRITZ

For over 20 years we've been providing modeling and OTS services to customers across a variety of different industry verticals, offering our customers proven OTS solutions that enable them to achieve their operator training objectives. We can connect our clients with any third-party DCS vendor, as well as develop software, offer flexible commercial models, and provide technical support 24/7 thanks to our global presence.

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