



SETTING THE NEW STANDARD:

Maximizing Casthouse Production
Efficiency Around the World

NALQUENCH™ TECHNOLOGY

NALCO Water
An Ecolab Company





YOUR GOALS ARE OUR GOALS

With NALCO Water as your partner, your process and operations receive a comprehensive approach that aligns with your short- and long-term goals. NALCO Water leads the way in state of the art research and technical support facilities reinforcing our specially trained field experts throughout the world. Our service professionals ensure program optimization and maximum value delivery through onsite technical support and troubleshooting.

OVER 300 SYSTEMS MONITORED IN ALUMINUM PLANTS EACH YEAR BY 3D TRASAR TECHNOLOGY AND OUR SYSTEM ASSURANCE CENTER

OVER 2.6 MILLION GALLONS PER YEAR SAVED FOR OUR ALUMINUM PRODUCING CUSTOMERS

2% IMPROVEMENT IN SCRAP LOSS WITH NALQUENCH OVER COMPETITORS

796,088,000 POUNDS OF CO₂ EMISSIONS ELIMINATED WITH LESS SCRAP REWORK



NALQUENCH Technology Driving Quench Stability

Optimizing Cast House Productivity

The technology behind casting aluminum ingots has dramatically advanced over the past twenty years, allowing aluminum producers to yield higher grade alloys at higher casting speeds than ever before. In parallel, the performance demands of the cooling water systems are dramatically amplified. Watercooled mold systems present unique water treatment challenges as the water comes into direct contact with the solidifying metal, thereby playing a critical role in heat extraction from the ingot surface and determining product quality. Through years of research, NALCO Water has proven that water treatment chemistry affects the capacity of water to extract heat, also known as the quench rate of water. In addition, cooling water's intimate interaction with the ingot/billet results in process contamination such as oils, greases, and suspended solids that requires additional treatment and control considerations to minimize the potential for corrosion, fouling, scaling and microbial growth. It is essential that the water system and treatment program balance quench rate control and total cooling water performance.

Setting the Standard in Cast House Water Technology

The NALQUENCH technology platform is centered on NALCO Water's 3D TRASAR control package, used to precisely regulate the water chemistry and provide immediate insight into the cast water performance metrics. While delivering consistent water quenability to the caster, Nalco's comprehensive solution provides operational efficiency, extended asset life, improved scrap rates, reduced environmental footprint and energy reductions associated with reduced remelt. NALQUENCH delivers on the critical KPIs around the caster and sets the new standard for cast house water treatment technology.

- Tagged polymer control
- On-line web access
- Traced corrosion package control
- Biocide package for higher alkalinity
- Available quench testing in the research lab
- Quench stabilizer
- Surfactant-free polymers
- System Assurance Center for 24/7 oversight monitoring

Optimizing Your Operations

✓ ASSET PROTECTION

Stresses like scale, microbiological activity and corrosion are automatically trended and identified to be addressed before they become issues

✓ OPERATIONAL EFFICIENCY

Operational performance is approached holistically, improving film boiling stability, oil removal and increasing production rates, saving and earning more money

✓ PRODUCTION AND ENERGY EFFICIENCIES SAVINGS

With improved deposit and corrosion control of your mold, waste scrap losses and corresponding CO₂ emissions are reduced. By preventing scale and microbiological deposits that hinder heat transfer, we reduce your energy demand

✓ OPERATIONAL TRENDING

NALCO Water's oversight program provides web-based trending at your fingertips with automatic trend reporting options as well as notification systems against stress trends.

WE COMBINE NALCO WATER EXPERTISE WITH THE INDUSTRY'S MOST ADVANCED TECHNOLOGY TO ADDRESS YOUR KEY BUSINESS DRIVERS.

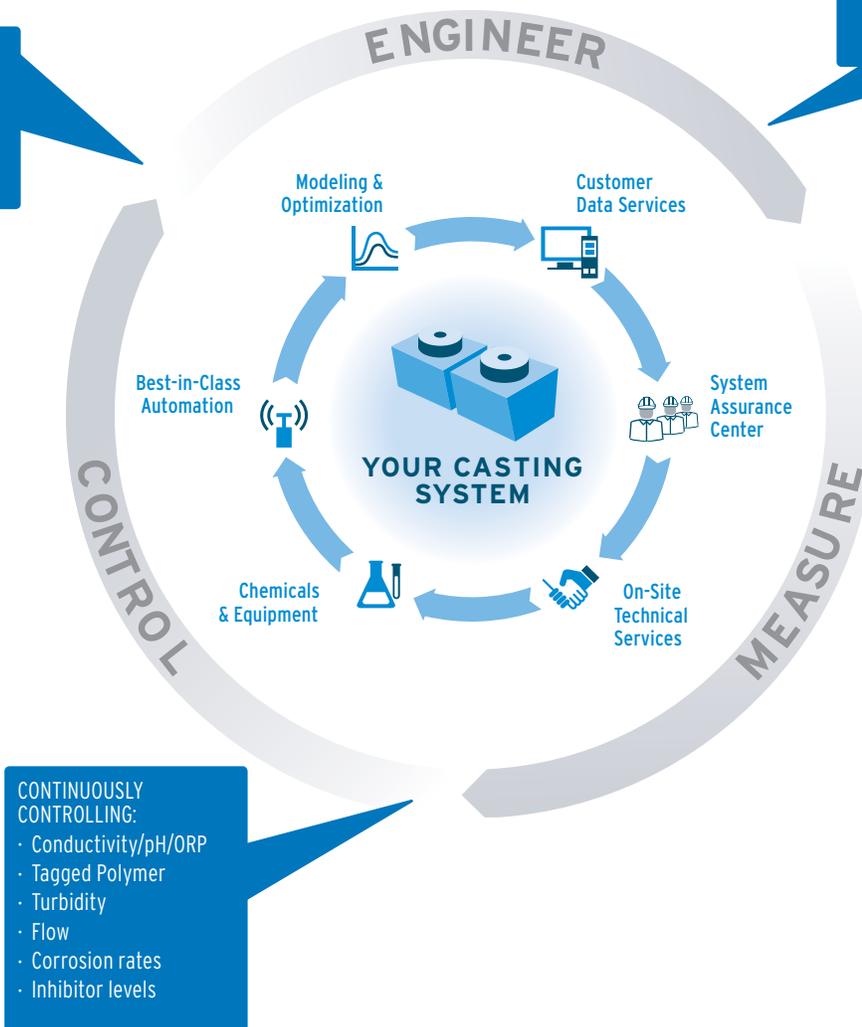
Engineer, Measure, Control

ENGINEER A chemical and automation program that delivers KPIs and quench stability

A team of experts provides 24/7/365 monitoring of your system

Providing research and quench testing support to the industry

CONTROL
The critical activities with online direct measurement



CONTINUOUSLY CONTROLLING:

- Conductivity/pH/ORP
- Tagged Polymer
- Turbidity
- Flow
- Corrosion rates
- Inhibitor levels

MEASURE
System performance and water chemistry with the most advanced control package available



With NALQUENCH technology...

CUSTOMER CHALLENGE

A major aluminum producer changed water treatment suppliers in an effort to reduce costs. After six months under the new supplier, severe performance concerns had arisen..

SOLUTION

NALQUENCH, including 3D TRASAR for online control and, PARETO as best practice technologies

IMPACT

This customer experienced significant improvements associated with the water system, including a full percentage point improvement in recovery, improved quench stability, increased system cleanliness and enhanced bacteria control. The Total Cost of Operations savings are estimated at more than \$460,000 per year.

CH-1710

A major aluminum ingot producer was experiencing scale formation in their molds and piping resulting in increased scrap, lost production and an increase in tooling changes.

NALQUENCH with NALCO Water's patented phosphonosuccinic oligomer (PSO) was chosen to address the aluminum hydroxide deposition.

- Total Cost of Operations savings estimated at more than \$1,413,000 per year.
- A 1.2% improvement in recovery rate was achieved and water-related ingot scrapping has been virtually eliminated. The cost savings associated with remelting scrap ingots is valued at \$763,000.
- Increased mold availability will generate an additional 6,500 metric tons of aluminum, or about \$650,000 per year in additional operating profit.

CH-1496

Regional heavy metals legislation that prevented the use of molybdate in open recirculating cooling water systems forced an aluminum manufacturer to look for alternative water treatment options..

NALQUENCH with 3D TRASAR automation and innovative PSO chemistry with actives-based corrosion control.

- Average Mild Steel Corrosion rate: 1.5 mpy; Average Aluminum Corrosion Rate: 0.38 mpy; No Pitting Corrosion Observed, leading to a cost avoidance of asset replacement
- No change in casting performance, and the NALCO Water PSO-based program was implemented permanently
- Avoided potential regulatory noncompliance
- Compliance with regional environmental standards with reduced use of heavy metals

CH-1170

CUSTOMER CHALLENGE

A major aluminum producer was experiencing poor casting water system reliability and performance resulting in extremely poor casting water quality and significant aluminum product scrap rates.

SOLUTION

NALQUENCH aluminum casting technology 3D TRASAR for online control; PSO with TRASAR System Assurance Center; innovative microbial growth control and quench aid..

IMPACT

- Scrap rates of less than 3% with further improvements still occurring.
- Cooling tower fill, filter media and molds are free of microbiological fouling.
- Total Cost of Operations savings estimated at more than \$1.1MM per year
- Average scrap rate has been improved by >20% an annual average of more than 96 million pounds of quality product shipments. Reduced cost of rework and lost production has generated more than \$960,000 per year in profits

CH-1681

An initial plant audit at a major aluminum ingot manufacturer by NALCO Water field staff revealed inconsistent, uncontrolled results with the current water treatment regime.

NALQUENCH with 3D TRASAR for on-line monitoring and prediction of corrosion and scale formation; Tagged High Stress Polymer (THSP); and a structured service plan.

- Mild Steel corrosion rates were reduced from 11.8 mpy to 1.5 mpy
- Soluble iron in the system dropped from 4.5 ppm to less than 1 ppm.
- Aluminum corrosion rates were maintained within industry guidelines at < 1.0 mpy.
- Maintenance has been significantly reduced.
- Recovery Rates improved from a statistical average of 97.5% to greater than 99%, which resulted in savings of \$777,000 per year.

CH-955

The plant was experiencing a build-up of scale and the ongoing corrosion was a major cause for concern for the plant management, as this presented a significant risk to production and productivity once the plant was operating at full capacity.

NALQUENCH with 3D TRASAR corrosion control chemistry in conjunction with a Tagged High Stress Polymer (THSP).

- Reduction in corrosion rate of 90% protecting vital process assets.
- Overall annual reduction in the Total Cost of Operation of €38,000

CH-1186E

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