

Aluminum Sheet Hot Rolling Superior Mill Cleanliness with 30% Reduction in Oil Consumption

QH EVEROLL™ A 5000 SERIES, NON-SOAP EMULSION

Background

Speira Holmestrand is part of the Speira group with several rolling facilities in Norway and in Germany. Speira Holmestrand is a fully integrated production site with major recycling capacities, a hot rolling line consisting of a breakdown- and a 2-stand 4-high tandem mill, 2 cold mills a finishing department and a separate lacquering line. Production ranges from 1xxx-3xxx-5xxx to 8xxx alloys, going into various applications like building and packaging industries. The hot mill produces ca. 120k ton rolled sheet annually.



Speira rolled aluminum production site in Holmestrand, Norway.

The Challenge

Having been in operation for many years, the hot mill has much experience working with both soap-based and soap-free emulsion technologies on its breakdown and tandem mills. From their experience there are advantages to both technologies, but also serious limitations:

- Soap-based products provide the highest level of surface quality of rolled material, especially for hard alloys. However, soap-based products form metallic soaps that build up over time to change/contaminate the emulsion, making it unstable and difficult to manage.
- Soap-free products are easier to maintain, and show lower consumption compared to soap-based chemistry. However, soap-free products produce extremely fine aluminum particles that deposit and cause sludge build-up problems at the mill and in the tanks.

Speira Holmestrand therefore required an easy-to-maintain emulsion that would reduce oil consumption, but also provide a high level of mill cleanliness.

The Solution

As the global leader in industrial process fluids, Quaker Houghton was already familiar with these industry-wide challenges and proposed QH EVEROLL™ A 5000, a new non-soap emulsion technology developed specifically to combine the strengths of both traditional soap-based and existing soap-free technologies.

Before introducing QH EVEROLL™ A 5000 into Speira Holmestrand, we utilized our unique pilot mill facilities in Qingpu, China to test the emulsion and rolling properties of the lab-developed product in a real mill environment. A custom-made hot rolling protocol was developed to investigate the following performance criteria:

- Work roll coating under hot rolling conditions
- Anodizing quality of hot-rolled material
- Fines dispersion and dirt buildup on the mill.

After very promising results on the pilot mill, Speira Holmestrand proceeded to a field trial of QH EVEROLL™ A 5000 with unprecedented success. Details of the trial can be found on the next page.

The Results After 5 Months

- Excellent mill and emulsion cleanliness
- Lowered consumption by 30% in comparison to soap-based chemistry.
- No emulsion related surface defects reported.
- No tank-side additives required.*
- High consistency of emulsion parameters.

*With the exception of a single ester addition during very early stages of product introduction.

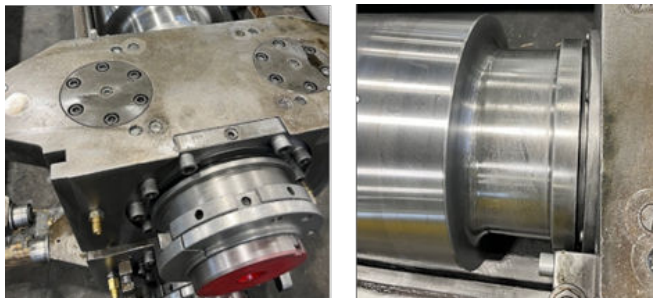


Field Trial

QH EVEROLL™ A 5000 was introduced to the tandem mill at Speira Holmestrand during the winter shut down 2023–2024. In cooperation with the customer, a cleaning procedure was developed and executed before the introduction to ensure best possible starting conditions. On-site and off-site technical support from Quaker Houghton was available at all times during the trial.

From the first coil on, excellent surface quality was observed for all alloys. To date (May 2024), no emulsion related surface quality issues are reported. Besides a single ester addition during the very early stages of the product introduction, no additional tanks-side additives have been used during 4 months of full operation.

Aluminum fines are well dispersed, resulting in superior mill and emulsion cleanliness. This is especially observed on the work roll chocks and adjacent mill equipment that was prone to dirt buildup before. The work roll coating is found uniform with no indication of pick-up, verifying the results already seen at the pilot mill.



The introduction of QH EVEROLL™ A 5000 has resolved issues with dirt buildup on the work roll chocks and adjacent mill equipment.

The emulsion parameters were recorded daily during the trial period. Because of high consistency the analysis was reduced to twice weekly measurements, reducing the necessary manpower for on-site laboratory work. Additionally, weekly off-site measurements at the Quaker Houghton laboratories were executed free of charge to ensure sufficient data coverage.

The introduction of QH EVEROLL™ A 5000 led to a 30% reduction in oil consumption compared to the soap-based chemistry previously in use.

Customer Testimonial



"Our goal was to improve mill cleanliness and reduce our oil consumption by upgrading to an emulsion that's as robust as possible. The introduction of QH EVEROLL™ A 5000 was seamless, with no issues from day one. After five months in operation, we've seen no surface defects, and our oil consumption has reduced by 30%. After years of using both soap-based and soap-free products we've never seen better mill cleanliness or so little fluid maintenance required for our emulsion system."

Runar Lundhaug

Production Manager Hot Mill at Speira Holmestrand

Conclusions and Outlook

With this successful trial and implementation of the QH EVEROLL™ A 5000 series, Quaker Houghton has introduced a superior non-soap emulsion technology to the aluminum hot rolling market. The QH EVEROLL™ A 5000 series reduces oil consumption and supports a high level of mill cleanliness, while providing excellent lubrication to ensure best-in-class surface quality.

The use of a pilot mill in the development of an aluminum rolling fluid was an industry first. With the successful transfer of QH EVEROLL™ A 5000 technology from laboratory to pilot mill, to full-scale industrial tandem mill at Speira Holmestrand, we have verified our unique development approach that enables us to de-risk fluid upgrades for our customers.

Benefits of QH EVEROLL™ A 5000 series

- Excellent lubrication properties yield high surface quality of hot rolled material, including after anodizing.
- Keeps mills clean by preventing soap buildup and sludge formation, with good fines dispersal resulting in easy filtration.
- Consistent fluid performance with low foam, no break-in period and very minimal tank-side additions required.
- Low consumption for reduced total cost of ownership.
- Minimizes waste through low skimmings volumes and reduced dumping frequency.

