AD Chemicals

Vertical pretreatment line (cascade)

Make your cascade line futureproof

Vertical pretreatment line

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The European Green deal and the ongoing energy crisis have a big impact on the European industry. This demands new ways of approaching the value chain. Where each player in the value chain takes its role to reduce its footprint and where collaboration and partnerships throughout the value chain become essential to create future proof solutions.

An important element of the architectural industry is the EU principle for building renovation towards 2030 & 2050. Which focusses on: Energy efficiency, Affordability, Decarbonisation and integration of renewables, Life-cycle thinking and circularity, Tackling the twin challenges of the green and digital transitions together, High health- and environmental standards, and Respect for aesthetics and architectural quality. Aluminum manufacturers are looking for ways to comply with the new EU building renovation standards towards 2030, by focusing on sustainable product offerings.

Companies also have to adopt to the EU's chemical strategy that aims to better protect citizens and the environment and boost innovation for safe and sustainable chemicals. AD Chemicals is a frontrunner in the market with regards to bringing chemical pretreatments to the market that enable companies to reduce their footprint. Key areas in this strategy are energy savings, water savings, reduce chemical consumption and maintenance costs while sustaining top level quality with regards to paint adhesion and corrosion protection.

In order to reduce the footprint of the production process AD joined forces with a key player in the aluminium industry and made a thorough analysis of the chemical pretreatment process at multiple production sites. One which is Qualicoat certified and another which is Qualimarine certified. This case study shows that when supplier and manufacturer intensify their cooperation, solutions can be realized that significantly reduce the ecological footprint, thereby taking important steps to make the production process future proof. This analysis resulted in several areas where the footprint could significantly be reduced when benchmarked against other similar companies in this field. Figures shown are based on actual average achievements within factories. The optimized areas are; energy consumption, chemical consumption, water consumption, amount of waste water (preparion for waste water free systems) and maintenance.

Energy savings

When looking at temperature of a chemical bath, in specific the cleaning and etching zone, a lot of companies in the industry still work with heated baths (up to 50°C). Operating on gas or electricity, these baths are high energy consuming. Thanks to advancements in chemical technology the temperature for chemical baths can be reduced to 30-35°C. When looking for example at energy consumption, a saving of up to 84% is realized when benchmarked with comparable companies.

(Waste) water savings

Due to the combination of pollution and over consumption, droughts and water scarcity are no longer considered a rare or extreme event in Europe. Approximately 20% of European land and 30% of its population are currently affected by water scarcity every year. Water scarcity is predicted to become more prominent as our climate changes. Regions across Europe are already seeing a drastic impact on the frequency of droughts. Southern European areas in particular are expected to experience increasing water shortages over the next decade, with disastrous consequences for the industry (Source: EIT Food, 2023). This stresses the fact that water savings are of vital importance.

In traditional line set ups the cleaning and etching zone causes several negative side effects a.o.; more contamination in subsequent process steps and the formation of sludge which leads to unnecessary amounts of waste water. The AD Chemicals process has optimized etching steps which improves (waste-) waterflow. The general process is that the cleaning and etching step are both acid, resulting in less negative effects of drag out. In addition, the (waste-) waterflow is arranged smarter (more effective and efficient) which significantly reduces the amount of waste water. The goal is to keep rinse water as pure as possible. It is a matter of continuous water replenishment, while maintaining the refreshment flow rate as low as possible. In this sustainable system water is partly recirculated. Please note, this is a unique feature of the AD Chemicals process. Hence, this set-up also reduces chemical consumption and enables additional savings in energy and maintenance.

As a benchmark, a cascade line with an output of 11.000 m² of aluminum per day can switch from 4000-5000 liter per hour water consumption to 500-900 liter per hour. This results in a reduction of 87% water consumption and up to 70% on waste water. This reduces the environmental footprint while also contributing to water availability in drought areas.

Chemistry savings

When benchmarking the AD Chemicals product consumption with other chemical technologies available on the market an average saving up to 17% on chemical consumption can be achieved due to improved lifetime of the chemical baths.

"Are you ready for the Green Deal?"

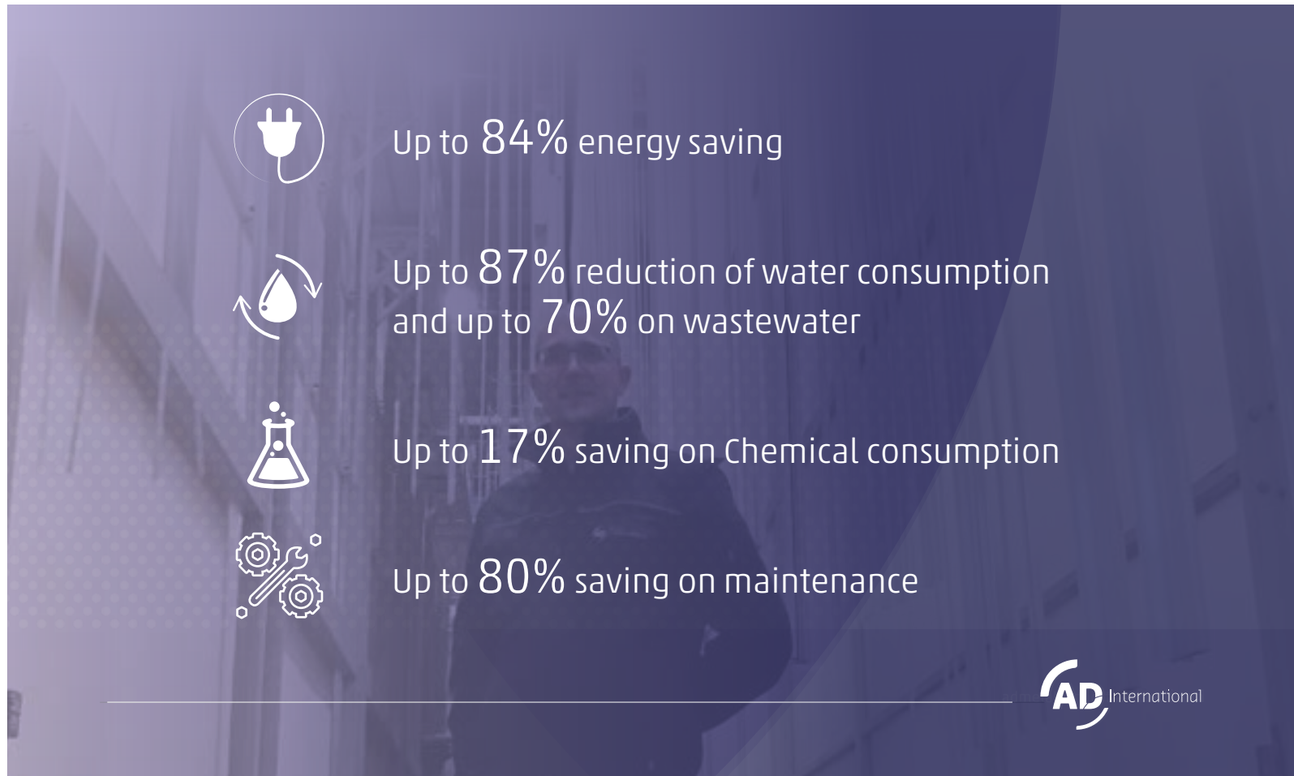
Maintenance savings

As a result of the different approach to the cleaning and etching process the following benefits are realized:

- Reduced carbonization of Caustic Soda reduces scale formation and increases the lifetime of the screens (side walls of the cascade line).
- Decrease in scale formation results in less sludge at the bottom of the etching tank and reduces scale buildup in pipelines and pumps, thereby positively impacting pump operating time
- Less wear on pumps. Pumps in traditional lines have to be replaced every three months. With the new line set up pumps are running even after one year. An average pump costs about 5000 euros, this means a saving of up to 20K/year.

Quality

Our optimizations clearly demonstrate important steps in making the pretreatment process more sustainable. The chemical process results in a proven stable process line, less sensitive to fluctuations. The upgraded cleaning and etching process, followed by a chrome free conversion coating, results in an aluminium surface that is ready to coat with excellent paint adhesion and corrosion resistant properties. These properties exceed the Qualicoat, GSB and Qualimarine standards. These labels require a 1000 hours AASS, AD has proven that even after 3000 hours AASS quality standards are met.



GREEN DEAL

"Take a major step in sustainability with the futureproof pretreatment process of AD Chemicals"

Roland van Meer
Business Unit Manager/ Sales Director AD Chemicals

AD International

Reduce CO_2 up to 75%

Energy savings

84%

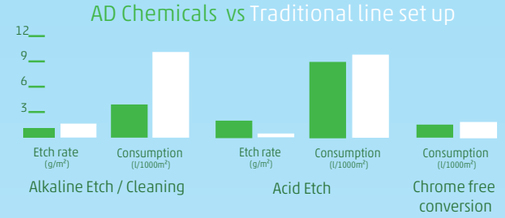
Operating temperatures of a chemical bath can be reduced to 30-35°C with new chemical technology. Saving up to 84% on energy consumption.

Chemistry savings

17%

The AD process enables savings up to 17% on chemical consumption and a longer bath life.

AD Chemicals vs Traditional line set up



In traditional line set ups the cleaning and etching zone causes several negative side effects a.o.; more contamination in subsequent process steps and the formation of sludge which leads to unnecessary amounts of waste water. The AD Chemicals process has optimized etching steps which improves (waste-) waterflow.

Water savings

87%

A cascade line with an output of 11.000 m² of aluminum per day can switch from 4000-5000 liter per hour water consumption to 500-900 liter per hour. This results in a reduction of 87% water consumption and up to 70% on waste water.

Consumption
AD Chemicals vs Traditional line set up

Maintenance savings

80%

Reduced carbonization of Caustic Soda reduces scale formation and increases the lifetime of the screens (side walls of the cascade line). This decrease in scale formation results in less sludge at the bottom of the etching tank and reduces scale buildup in pipelines and pumps, thereby positively impacting pump operating time.

Quality

Exceeds requirements of Qualicoat, Qualimarine and GSB quality standards.

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