



## CASE STUDY

Customer: Alcoa-Köfém Ltd (Flat Rolled Products FRP)  
 Site: Székesfehérvár, Hungary  
 Items: Coiled Aluminum Sheet Metal Rolling  
 Light Rolling Oil with Additives

## Oil Expenses Reduced by 60% and Elimination of Staining Related Aluminum Coil Rejects

### CHALLENGE

A major Aluminum rolling mill located in Hungary needed to reduce its operational cost and improve the quality of its end product. The Aluminum rolling mill identified the rolling oil total overall cost was excessive and should be reduced. Additionally, they realized that both operational cost and quality improvements could be realized by reducing or eliminating the number of finished Aluminum coils returned due to staining. The rolling mill determined that the rolling oil overall cost consisted of three parameters: (1) the replacement cost of virgin oil on a monthly basis, (2) the disposal cost of oil that had become contaminated with ML1 (mill lubricants) during the production process and (3) accumulated oil found in collection trenches that had also become contaminated with water and other industrial fluids. Furthermore, the rolling mill determined that the finished Aluminum coils that exhibited a stained finish were directly related to the poor quality of filtered oil that was returned for reuse in the production process. The Aluminum rolling mill representatives knew that the mill lubricants were emanating from bearing oil leaks, gearbox leaks and hydraulic oil leaks and are typical occurrences during the normal operation of the rolling mill. Consequently, complete elimination of these leaks was not realistic; therefore, a control process needed to be implemented. Additionally, these same mill lubricants, and excessive water mixed with the rolling oil, can cause stains on the Aluminum sheet which leads to increased cleaning costs or even rejects of the finished sheet metal coils.

Given the challenge this rolling mill was facing, the first goal was to reduce and control the amount of water and mill lubricants contaminating the rolling oil, while also reducing both waste disposal volume and related fresh oil replacement costs by **60%**. The second goal was to reduce the staining related reject of Aluminum sheet metal coils by **50%**.

The rolling mill process generates inconsistent intake of mill lubricants which make it difficult to achieve and control the target of <1,5% ML concentration. Before implementation of CRS combi-distillation, it was necessary to dump valuable rolling oil to meet the mill lubricants percentage target as well as dispose of rolling oil collected in trenches that became contaminated with water and other industrial fluids.

Both practices resulted in **15%** of the total amount of usable rolling oil being discarded.

### SOLUTION

CRS Reprocessing created a solution for Alcoa Köfém FRP to control and remove incoming mill lubricants while also dehydrating the water contaminated rolling oil. The CRS custom designed combi-distillation system (combined fluid dehydration and distillation) is able to control contaminants such as water and mill lubricants according to the customer specification. In addition, all remaining ultra-fine cracking particles within the rolling oil are removed. The combi-distillation system is supplied from two fully operational cold rolling mills and a collection trench with contaminated rolling oil. The system is able to reprocess up to 14,000 liters per day and is completely integrated into the Alcoa Köfém FRP process.



CRS Reprocessing also provides continuous laboratory testing to guarantee that quality levels and specifications are maintained. The used and recycled rolling oil is being measured by a trained CRS technician who monitors the system 24/7. The CRS onsite technician continuously monitors and controls the process by measuring daily water content, percentage of mill lubricants in product, kinematic viscosity, TAN (total acid number), specified percentages of additives and the recovery rate.

## CRS combi-distillation at Alcoa Kőfém

## RESULTS

After installation and optimization, the CRS combi-distillation system is currently reprocessing 250,000 liters per month with a stable quality that meets the customer's specifications. The customer has seen elimination in staining related reject coils after installation of CRS combi-distillation.

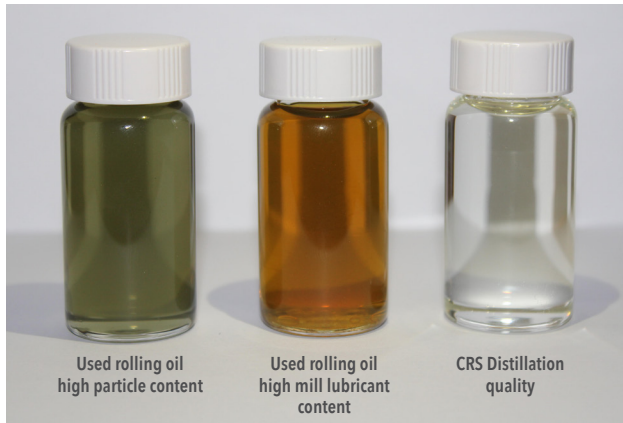
The CRS combi-distillation system made it possible to stop the rolling oil dump entirely and lower the oil disposal from 21m<sup>3</sup>/month to about 6m<sup>3</sup>/month. The 15m<sup>3</sup>/month difference on disposed rolling oil lead to a reduction of 15m<sup>3</sup>/month fresh oil intake. This contributed heavily to the overall cost savings.

CRS has supported the customer to achieve the following goals:

- Reduce volume and costs for disposed rolling oil by **60%** saving 4,500, €/month\*
- Reduce rolling oil dump fresh oil consumption by **60%** saving 16,200, €/month\*
- Eliminate staining related Aluminum coil rejects, saving 6,250, €/month\*
- Remove water from trench oil to allow recovery

The CRS Reprocessing combi-distillation system has achieved a very consistent distillate quality within the agreed specification:

- Reduction of mill lubricants to **<0,1v%**
- Reduction of water content to 100mg/l
- Recovery rate on rolling oil **>99,7%**
- Alcohol additive recovery **>98%**
- Acid additive recovery **>75%**



## Comparison of rolling oil qualities

The first sample left side was taken during occurrence of ultra-fine cracking particles; the middle sample was taken after heavy hydraulic leak. Regardless of the used oil contamination, the distillate generated by the CRS Reprocessing combi-distillation system will remain within specification as shown on the right. The combi-distillation process is able to remove nearly **99.98%** of impurities and thereby has significantly reduced the total cost of plant operations.

<sup>1</sup>ML refers to "mill lubricants" such as gear and hydraulic oil.

\*Cost savings are estimated by CRS