

# Mixed metallurgy pulp dryer? – How to, simultaneously control iron and copper corrosion?

Aminox 60 and Amina 8037 - Recovery Boiler 95 bar, 130 kg/s, 476 °C

## Background

Most of the Finnish recovery boilers have utilized feed water chemical blends consisting of both oxygen scavenger and volatile amines. In all steel systems, this is normally not a problem, but in mixed metal system, the steam pH has been limited to range pH 8.9 in order to protect copper alloy components. Consequently, corrosion of steel has been high leading to high condensate iron levels and iron oxide scaling of the system.

## Chemistry improvement

For trial, the blend was replaced by two separate formulas in order to avoid excessive scavenger dosage, while raising system pH. All the applied molecules were chosen to minimize ammonia levels in steam. Ammonia forms a complex with copper oxide and is known to be especially fatal to copper at high pH.

The system monitoring was a responsibility of an independent consultant <sup>1)</sup>. The primary parameters monitored were:

- ✓ pH
- ✓ conductivity
- ✓ ammonia
- ✓ copper
- ✓ iron

## Goals

The major targets were:

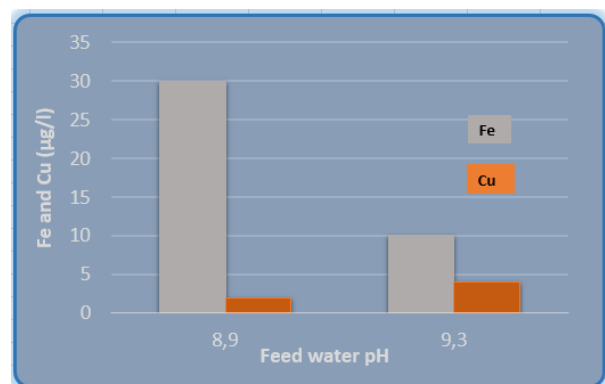
1. Steam pH 9,2 – 9,3
2. Pulp dryer condensate copper < 5 µg/l
3. Feed water iron < 10 µg/l

## Trial

After collection of the base data, the earlier feed water chemical was replaced by an oxygen scavenger Aminox 60 and volatile a amine blend Amina 8037. Steam pH was raised from 8,9 to level 9,2 – 9,3. The Program was optimized for a few months, after which the new balance was recorded and comparisons made.

## Findings

1. The feed water pH was raised 8,9 → 9,35
2. The pulp dryer condensate copper remained < 10 µg/l
3. Feed water iron level was reduced 30 → < 10 µg/l
4. Boiler water iron level was reduced 25 → < 10 µg/l



## Benefits of chemical program Aminox 60 and Amina 8037

1. Higher system pH effectively inhibits iron corrosion
2. Copper concentrations remained under control. Normally, copper exchanger resin in the condensate system anyway cut the copper level to zero.
3. Iron oxide levels in the boiler circulation are dramatically reduced, thus minimizing scaling and deposits
4. The risk of under deposit corrosion and need of acid cleaning are reduced.

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