Heat Management

Finspångs Tekniska verk

Application: Smoke tube boiler (biomass) and water tube boiler (waste)
Efficiency solution: Infrasound Cleaning
Cleaning area: Boiler, economizers and flue gas channel

General info

Plant: Recycling center
Boilers: 1 × KMW grate-fired biomass, 1 × waste-fired
Fuel: Wood chips & forest residue/ Waste
Capacity: 15 MW_{th} each boiler

Installation

Type: APM350 (2 pcs)
Year: 2008 (bio boiler), 2024 (WtE boiler)

Overview

Finspångs Tekniska Verk operates two separate boilers at a recycling center: a 15 MW_{th} grate-fired biomass boiler (KMW, grate) running on wood chips and forest residues, and a waste boiler running on waste fuel. Since 2008, the biomass boiler's smoke tube section has utilized infrasound cleaning technology from Heat Management to improve performance and reduce fouling.
In 2024, a second APM350 unit was installed, targeting the seperate waste boiler's economizer sections and the downstream flue gas channel, eliminating the need for mechanical cleaning methods.



Figure 1. *Customer's site.*

Situation before 2008

Before installing infrasound cleaning on the biomass boiler, the unit experienced significant fouling and operational limitations:

- Two audible sonic horns were installed but caused high noise levels and poor cleaning performance
- Deposits built up quickly on heat transfer surfaces, causing:
  - *Rapid increase in flue gas outlet temperature (130°C → 250°C)*
  - *Reduced efficiency and availability*
- The boiler required manual cleaning at least four times per year
- At low load, fouling occurred rapidly, limiting continuous operation to only a few weeks

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Results After First Installation

The impact of the first infrasound cleaner on the biomass boiler was immediate and long-lasting:

- 5–10% increase in production capacity (Customer's calculation)
- Stabilized flue gas outlet temperature:
  - *Previously unstable at low load*
  - *Now maintained around 130–190°C*
- Drastically reduced need for manual cleaning
  - *In many cases eliminated entirely when using wood chips*
- Improved availability and continuous operation
- Supported the transition to lower-cost fuels (forest residues)

Over time, the installation proved robust, delivering consistent cleaning performance and operational stability.

First Installation (2008)
Solution: 1 × APM350
Boiler: Biomass
Cleaning area: Entire boiler

Audible sonic horns were taken out of operation after installation.



Figure 2. *First infrasound installation at the top of the smoke tube boiler.*

System Expansion (second boiler)

After many years of successful operation on the biomass boiler, further improvements were targeted at a separate waste boiler at the same facility.

Second Installation (2024)
Solution: 1 × APM350
Boiler: WtE
Cleaning area: ECO 1 (partial), ECO 2 (full), FG channel before FG filter

Eliminated need for shot cleaning and compressed air cannon.

Purpose of the Expansion

The primary objective of the second installation was to eliminate the need for shot cleaning (steel ball cleaning) in the waste boiler's economizer. While effective, shot cleaning causes mechanical wear on tubes and surfaces and requires additional maintenance.

By extending the infrasound cleaning system, the goal was to:

- Maintain the same cleaning performance
- Remove the need for shot cleaning entirely
- Reduce wear and extend component lifetime
- Improve overall system reliability

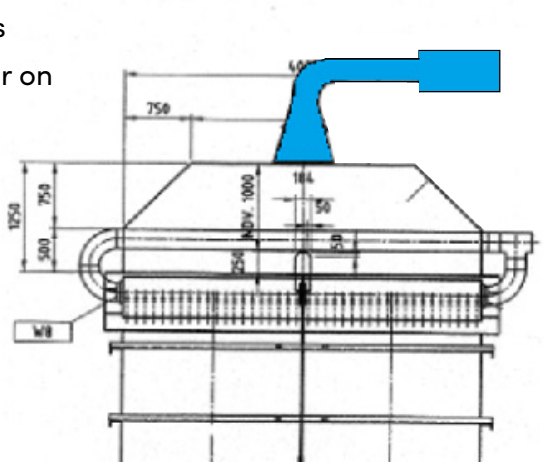


Figure 3. *Second infrasound installation at the top of the ECO-stack.*

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Results After Second Installation

The customer documented several improvements following the expansion on the waste boiler:

1 Elimination of Mechanical Cleaning in the Economizer

Economizer 2 on the WtE boiler is now kept clean without the use of shot cleaning. Cleaning performance is equivalent, but achieved without mechanical wear.
This reduces long-term damage to tubes and surfaces and lowers maintenance requirements.

2 Elimination of Auxiliary Cleaning Systems

A compressed air cannon was previously required to remove deposits in the flue gas channel of the WtE boiler. The channel would previously clog multiple times per year. After installation, the air cannon is no longer needed.

3 Continuous Operation Without Cleaning Stops

Only minor deposits now form on channel walls. Deposits are small enough that no shutdowns are required for cleaning during operation.

4 Reduced Deposits in Critical Areas

The flue gas channel downstream of Economizer 2 in the WtE boiler remains clean even after extended operation. The top of the flue gas filter, where several tons of lime dust previously accumulated, is now significantly cleaner.



Figure 4. *Images of the flue gas channel downstream of Economizer 2 in the WtE boiler. The left image shows significant deposit buildup after approximately one month of operation without infrasound cleaning. The right image shows the same location after several months of operation with infrasound cleaning, where only minimal deposits are present.*

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Overall Benefits

Operational Performance

- Stable heat transfer and flue gas temperatures
- Increased availability and longer continuous operation
- Reduced risk of fouling-related disruptions

> "The infrasound cleaning performs just as well in ECO 2 as the shot cleaning at similar temperatures — without the wear on walls and tubes."
>
> — Maintenance Manager, Finspångs Tekniska Verk

Maintenance & Reliability

- Drastically reduced need for manual cleaning
- Elimination of auxiliary cleaning systems
- Removal of shot cleaning, reducing wear and extending equipment lifetime

Efficiency & Cost Savings

- Increased production capacity
- Ability to use lower-cost fuels
- Reduced maintenance costs and downtime

Conclusion

This case demonstrates the long-term effectiveness and scalability of infrasound cleaning technology across multiple boiler types at the same facility.

The initial 2008 installation on the biomass boiler's smoke tube section resolved critical fouling issues and improved overall performance.

The 2024 expansion on the waste boiler's economizer further optimized the system by extending cleaning to downstream components and eliminating mechanical cleaning methods.



Figure 5. *Economizer 2 looking clean after recent water wash and using Infrasound.*

Together, the two installations provides the two boilers with a reliable, low-maintenance cleaning solution that improves efficiency, reduces wear, and supports stable long-term operation across the entire facility.

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