

CASE STUDY



Fuel Additive conditions fuel for better performance and reduces fuel cost

Overview

Sooting, fouling, clinkering and other combustion deposits are common fireside occurrences in boilers and thermic fluid heaters. The adhesive properties of un-burnt carbon results in the formation of incombustible solids on the heat transfer surfaces, resulting in poor heat transfer, reduced overall boiler efficiency, and increase in fuel consumption. Thermax provides series of fuel additives and fireside chemicals for liquid and solid fuel fired boilers to condition fuel for better performance and operation of the systems.

An existing customer who was using our boiler water chemicals, was facing issues with clinker formation and emission of suspended particulate matter. The customer approached Thermax for solutions that can help them improve fuel combustion in their boiler systems. Thermax's recommended treatment program for fuel management – THERMOSOL® SPM, an effective fuel additive, helped customer in ensuring proper combustion, reduction in clinker formation and increase in heat transfer.



Challenge

Parameters such as smoke index number, percentage of carbon monoxide, carbon di oxide, flue gas temperature, furnace oil temperature etc. were analyzed with the help of flue gas analyzer. Following problems were clearly evident in the system:

- Clinker formation.
- Excessive suspended particulate matter.
- Nozzle choking.
- Improper Combustion.

The impact of clinker formation resulted in frequent cleaning, increased down time and increase in fuel consumption. This meant a specific treatment program for better fuel performance was required.

Indicators

- Higher the smoke number indicates higher carbon monoxide indicating un-burnt carbon.
- Smoke number of 2 to 4 is an indication of efficient boiler.
- Higher carbon di oxide indicates conversion of carbon mono oxide into carbon di oxide meaning better fuel combustion.
- Higher flue gas exit temperature result in lower boiler efficiency.

Solution

After an in-depth analysis of parameters, Thermax recommended Thermosol range of multipurpose liquid fuel additive -THERMOSOL® SPM to be added to the fuel for better performance.

To check the effectiveness, comparison of following parameters of the boilers with and without treatment with THERMOSOL® SPM was done:

- Smoke index.
- Physical observation.
- CO₂ analysis.
- Flue gas exit temperature.

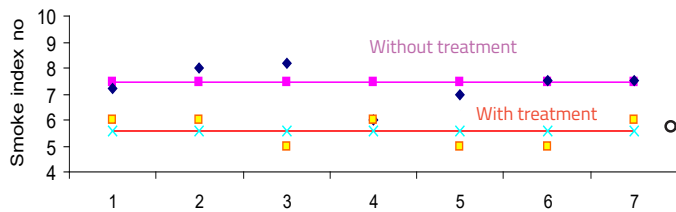
Observations

Post-treatment with THERMOSOL® SPM, following observations were made over a period of time:

- Initially, without treatment the smoke index was on an average 7.5 which was reduced to 5.5.
- Increase in CO₂ % from an average of 9% to 11%.
- Decrease in flue gas exit temperature from an average of 225°C to 215°C.



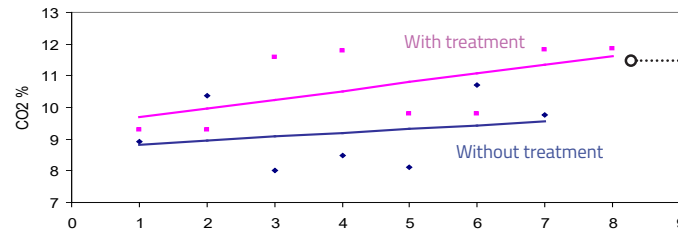
Smoke Index Number



Decreased smoke index number with Thermax treatment

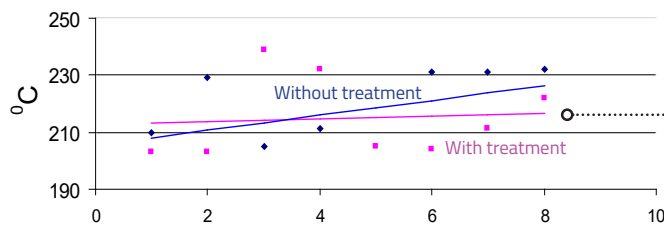


CO₂ Emission



Increased CO₂ emission with Thermax treatment

Flue Gas Temperature



Decreased flue gas temperature with Thermax treatment

Result

After going through pre and post analysis of fuel additive treatment, there was a clear indication of performance improvement:

- Emission of suspended particulate matter (SPM) drastically reduced during the treatment.
- 33% reduction in smoke index number was obtained after the treatment with THERMOSOL® SPM.
- Substantial reduction in clinker formation was observed which indicate complete combustion of the fuel.

Innovation & Technology

Thermosol range of liquid fuel additives are formulation of combustion catalysts, dispersants, oxidising agents, propellants and oxidizers in balanced quantities that help condition fuel for better performance and operation of the systems.

Benefits to Customer

- Reduction in clinker formation.
- Increase in heat transfer.
- Ensuring proper combustion.
- Increase boiler efficiency.
- Reduction in fuel consumption.
- Fuel cost savings.