

White Paper:

Brown's Gas HHO Oxyhydrogen Integration in Coal-Fired Boiler - A Real-world Trial



Executive Summary:

This white paper outlines a real-world trial conducted by Hunan Energy Saving Evaluation Technology Research Centre, exploring the catalytic combustion assist modification for industrial boilers using hydrogen-oxygen gas (Brown's Gas HHO Oxyhydrogen). The insights derived from this trial served as a foundational basis for the comprehensive "Handbook on Optimizing Boiler Performance with Brown's Gas HHO Oxyhydrogen." The trial, conducted in collaboration with paper packaging manufacturer Zhongshan Yihao Energy Co., Ltd., aimed to assess the practicality and efficiency of integrating Brown's Gas technology into a coal-fired boiler.



Introduction:

The trial focused on evaluating key technical considerations, including ignition temperatures, ignition delay times, combustion kinetics, flame dynamics, stability factors, combustion duration, and prolonged combustion influence.

Technical Considerations:

Ignition Temperatures:

The trial demonstrated a marked reduction in ignition temperatures, optimizing the combustion process and enhancing energy efficiency.

Ignition Delay Times:

Brown's Gas integration exhibited shorter ignition delay times, indicating quicker and more efficient combustion initiation.

Impact on Combustion Kinetics:

In-depth analysis showcased a positive impact on combustion kinetics, leading to improved overall efficiency.

Flame Dynamics:

Brown's Gas influenced flame stability, shape, and propagation, contributing to a stable and controlled combustion environment.

Stability Factors:

The trial revealed increased stability factors, highlighting the reliability of Brown's Gas technology in varied operational conditions.

Combustion Duration:

Extended combustion duration was observed, emphasizing the sustainability of energy production.

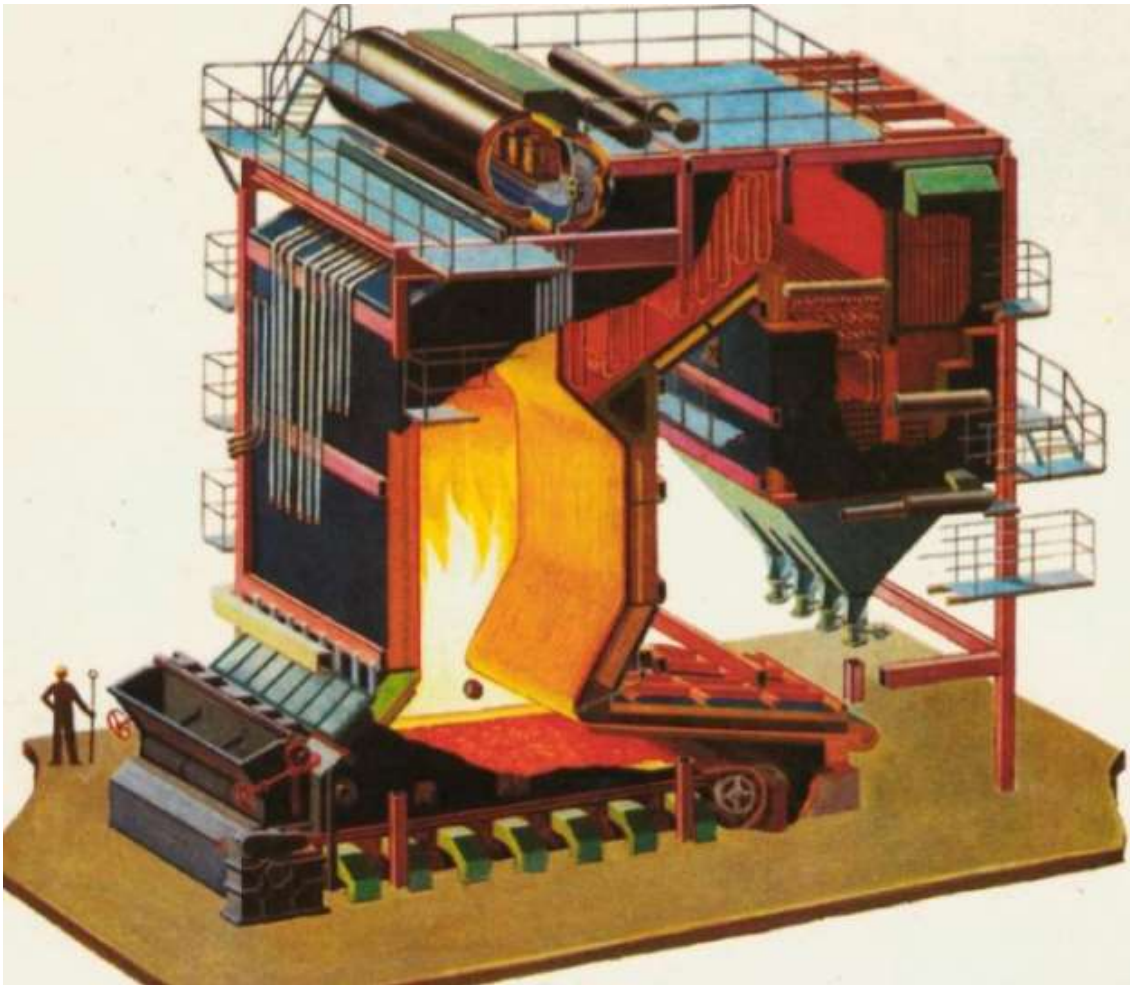
Prolonged Combustion Influence:

Brown's Gas integration demonstrated a prolonged influence on combustion, contributing to sustained energy output.



Installation and Effects:

The trial involved installing Brown's Gas HHO Oxyhydrogen with primary and secondary air intakes. This dual-intake setup aimed to optimize combustion by strategically introducing Brown's Gas into different phases of the process. The primary air intake facilitated ignition, while the secondary air intake supported the ongoing combustion process. This bifurcated approach enhanced control over the combustion dynamics, resulting in improved efficiency and reduced emissions.





On-Site Evaluation Data Metrics:

Energy Saving Benefits:

Annual energy savings: 11.8% of standard coal.

On-Site Evaluation Information:

Evaluation Organization: Hunan Energy Saving Evaluation Technology Research Center

Evaluation Date: June 17, 2017

Evaluation Leader: Professor Jiang Li, Contact: 0731-88830269

Evaluation Personnel: Zhou Hongfei, Luo Zhengyi

On-Site Evaluation Records:

The Brown's Gas HHO Oxyhydrogen energy machine model: 6,500 L/hr (6.5 SCM/hr).

Steam output supplying steam for packaging paper production.

Hydrogen-oxygen gas enters the furnace through the primary air duct.

On-site observation: Yellow-white flame, no visible smoke, complete combustion of ash residue.

Data collected: Boiler steam flow, coal consumption, electricity consumption.

Affirmation of energy-saving effect by the user.

On-Site Evaluation Conclusion:

- Rapid ignition of hydrogen in the furnace.
- Overall furnace temperature increase.
- Intensified radiative heat exchange.
- Decrease in CO in flue gas and carbon content in ash.
- Energy-saving, environmentally friendly, safe, efficient, and stable benefits observed.
- This 6 TPH chain furnace operation confirms a relative energy-saving rate of 11.8%.



Conclusion:

The real-world trial, augmented by on-site evaluation metrics, conducted by Hunan Energy Saving Evaluation Technology Research Centre served as a pivotal precursor to the creation of the "Handbook on Optimizing Boiler Performance with Brown's Gas HHO Oxyhydrogen." The positive results obtained from the trial underscore the practicality and effectiveness of integrating Brown's Gas technology into coal-fired boilers. This white paper acts as a bridge between the trial's empirical data, on-site evaluation metrics, and the handbook, providing professionals with a comprehensive understanding of the technology's real-world application.