

Capabilities Update

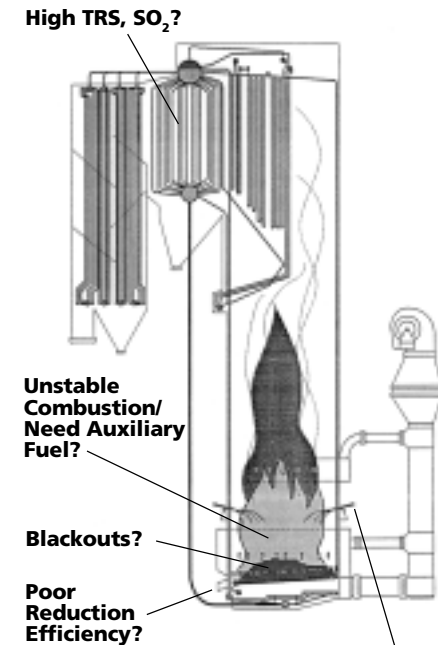
- Combustion system upgrades for waste fuel and chemical recovery boilers
- Engineer-Procure-Construct (EPC) boiler retrofit projects
- Power and recovery boiler performance evaluations and operational reviews
- Boiler water side circulation analyses
- Ultrasonic Flow Monitoring (UFM) for circulation measurements
- Computational Fluid Dynamics (CFD) modeling of combustion processes
- Oxygen enrichment of combustion air (OEA)
- Recovery boiler audits, inspections and surveys
- Project scope definition, equipment specifications and cost estimating
- ASME Boiler and Pressure Vessel Code Section I "S" stamp for power boiler design and NBIC "R" stamp
- Boiler downtime and pressure part failure analysis
- Boiler outage management
- Piping stress analysis
- Operations support and training
- Feasibility studies and cost/benefits analyses
- Incineration of dilute noncondensable gases (DNCGs) in power and recovery boilers
- Primary and secondary sludge incineration
- Full-service engineering design for steam, power and combustion systems

For further information about how Jansen can assist your facility in improving the operation and performance of waste fuel and chemical recovery boilers, please call Ned Dye at 425.825.0500 ext.125, or Arie Verloop at ext.111.

Visit our web site at www.jansenboiler.com

Need More Black
Liquor Throughput?

Are your Options too Expensive?



**Need More
Black Liquor
Throughput?**

**Is Your Recovery
Boiler Limiting
Your Operations?**

**Problem
Solution**

JANSEN

Problem
Solution

PROMO₂X™

Oxygen enriched air (OEA) has been used for years to improve combustion processes in the glass and metal refinery industries . OEA has proven to be a safe, cost effective method of improving product quality and quantity. Now, Jansen and Air Liquide have a patented process for applying OEA to kraft recovery boilers.

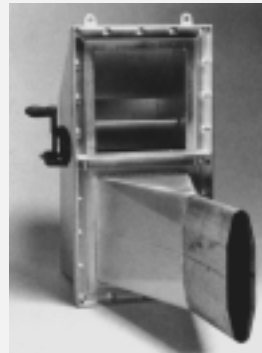
Our OEA process, trademarked PROMO₂X™, provides:

- An increase in black liquor solids throughput
- A reduction in TRS and SO₂ emissions
- An increase in chemical reduction efficiency
- More stabilized combustion in the lower furnace for better bed control and eliminating blackouts or the need for auxiliary fuels

PROMO₂X™ works by increasing the oxygen content in the combustion air at the secondary and/or tertiary air levels. With combustion air oxygen levels of 25% (increased from the normal 21%), a significant reduction in dead load nitrogen is supplied to the furnace, resulting in a reduction by 15% in the amount of flue gas that is generated. This allows:

- An increase in the amount of black liquor burned, nominally by 15%, or
- A reduction in furnace outlet flue gas velocities to reduce pluggage, and
- A reduction in carryover of liquor, char, and smelt.

Jansen High Energy Combustion Air Nozzle



Jansen air nozzles achieve:

- High air/OEA mixture jet velocity at nozzle tip
- Deep jet penetration inside the furnace cavity
- Separate air/OEA flow measurement capability per nozzle
- Turbulent mixing of combustion air/OEA with combustibles at high temperature
- Low TRS, CO, and VOC emissions
- Easy shut-off capability of the OEA without interfering with boiler operations
- No leaks
- Low pressure loss
- No/low maintenance

Injection of OEA with JANSEN Air Nozzles

The patented Jansen High Energy Combustion Air Nozzles™ provide excellent characteristics for injection of OEA into recovery boiler furnaces. The nozzles efficiently develop high velocity jets that convey the mixture of combustion air and enriching oxygen well into the furnace cavity, avoiding any possible corrosion that could be caused by elevated oxygen concentrations adjacent to the tube walls. The nozzle jets provide turbulent mixing that rapidly combines the OEA with the fuel so that it is fully utilized.

Unique Alliance

Jansen’s expertise in recovery boilers and combustion air delivery systems, combined with Air Liquide’s expertise in oxygen production, handling, and delivery, provides a unique alliance for the safe and effective application of OEA in recovery boilers.

Low Capital Cost

A PROMO₂X™ system can be provided in an “over-the-fence” financial arrangement which allows the end user to “pay-as-you-go” with minimal upfront capital expenditures.

Overall Benefits

Increased black liquor throughput leads to:

- Recovery boiler no longer bottleneck
- Stop shipping liquor
- Increased pulp production rates
- Significant improvement in mill profitability

The Time has Come...

The concept of enriching recovery boiler combustion air with oxygen is not new. Recent technological developments now provide safe, efficient and economical application through the Jansen/Air Liquide patented process.

For information please contact Arie Verloop at 425.825.0500 ext. 111, or e-mail at arie.verloop@jansenboiler.com.