

World-Class Testing, Research And Development

We invest heavily in people, facilities, and capabilities — developing the tools and expertise needed to prove performance for our customers and solve some of the industry’s most complex problems. Our Research and Development Test Center is the largest and most

advanced testing complex of its kind. This not only allows us to push innovation for future solutions, it enables us to test customer equipment in an industrial setting under specific, real-world conditions.



Research and Development Test Center

TRUSTED SERVICE AND SUPPORT

We leverage our renowned expertise and global resources to offer the most comprehensive, value-added aftermarket products and technical services available for thermal oxidizers. Our aftermarket team is dedicated to helping you keep your system online. Through installation and start-up services, training, engineering studies, upgrade packages, and turnaround services, we can help you operate your TO system safely, efficiently and reliably. Our experts are available 24/7. We also provide additional support by offering world-class education through comprehensive courses held at the John Zink Institute.SM

GLOBAL REACH

John Zink has locations all over the map, with thousands of employees worldwide.



Global Headquarters // Tulsa, OK, USA // +1-918-234-1800 // To locate an office in your region, visit johnzink.com/contact.

SULFUR RECOVERY COMBUSTION SOLUTIONS

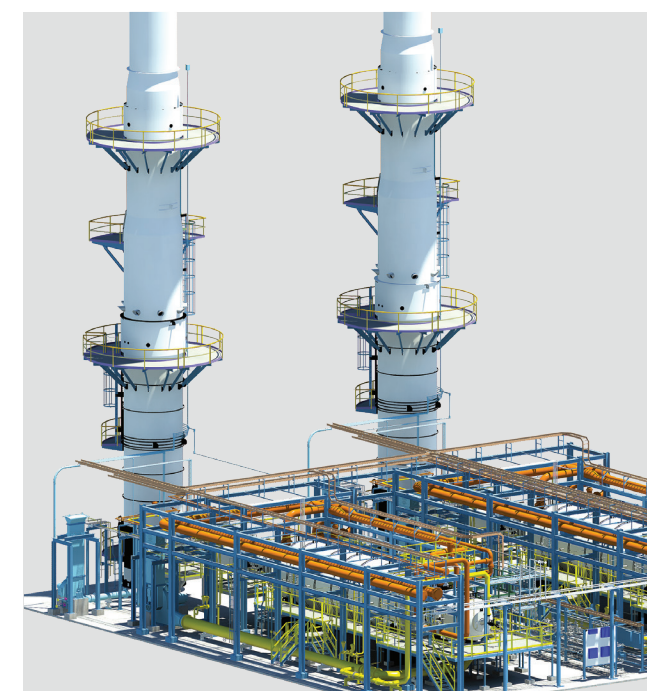
Proven SRU Performance For Seamless System Integration

John Zink is a recognized leader in combustion-related sulfur recovery system equipment and thermal and catalytic oxidizers. We have thousands of installed thermal oxidation systems globally and have supplied the reaction furnace and thermal oxidizer packages on many of the world’s largest Claus sulfur recovery projects.

Our proven capabilities allow us to provide complete packages on larger systems where integration is key to successful operation. We supply all necessary equipment for fired processes within the Claus sulfur recovery unit, including acid gas burners, reaction furnaces, in-line heaters, reducing gas generators, and tail gas incinerator packages. We work both through appointed Licensors for the Claus SRU process and independently, providing complete process design and supply for all the fired equipment in the sulfur recovery unit.

We can supply packaged units with controls and burner management systems, or any of these components, custom-designed for your particular needs:

- Acid gas (main) burners
- Reaction furnaces
- Tail gas incinerators
- Flame scanners
- Low NOx burners
- Acid gas flare
- Waste heat boilers
- Steam superheaters
- High energy igniters/pilots
- In-line heaters/RGG
- Stacks



Proven sulfur recovery solutions backed by world-class service and support. That’s smart. That’s John Zink.



KEU™



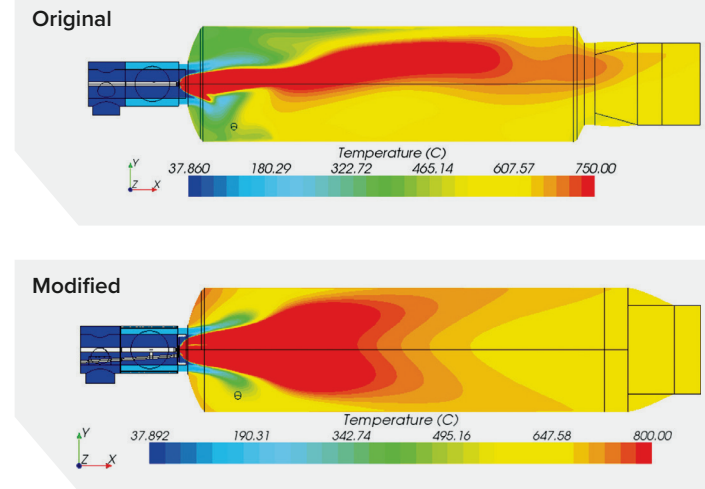
THE CLAU PROCESS

The Claus process is the most widely used process for treatment of off gas and is used to reduce hydrogen sulphide and the other sulfur compounds to elemental sulfur. The Claus process starts with treatment of the amine scrubber tail gas with a thermal reaction furnace (or Claus furnace) where the acid gas is reduced to elemental sulfur at high temperature under controlled combustion conditions. The reaction furnace gases are cooled in a waste heat boiler and gaseous sulfur is

condensed. The gases then pass to the Claus reactor where residual sulfur compounds are catalytically converted to sulfur in one or more stages. To improve the efficiency of the process, the gases are reheated in the in-line heaters upstream of the Claus reactors. Tail gas treatment is used to further increase the sulfur removal efficiency before the tail gases pass to the tail gas incinerator.

CFD EXPERIENCE AND EXPERTISE

John Zink is an industry leader in Computational Fluid Dynamics (CFD) modeling. Combined with our extensive experience in design and manufacturing of combustion equipment, our CFD expertise ensures predicted performance upon start-up and delivers confidence in your decision to go with the leader.



SULFUR RECOVERY PROCESS

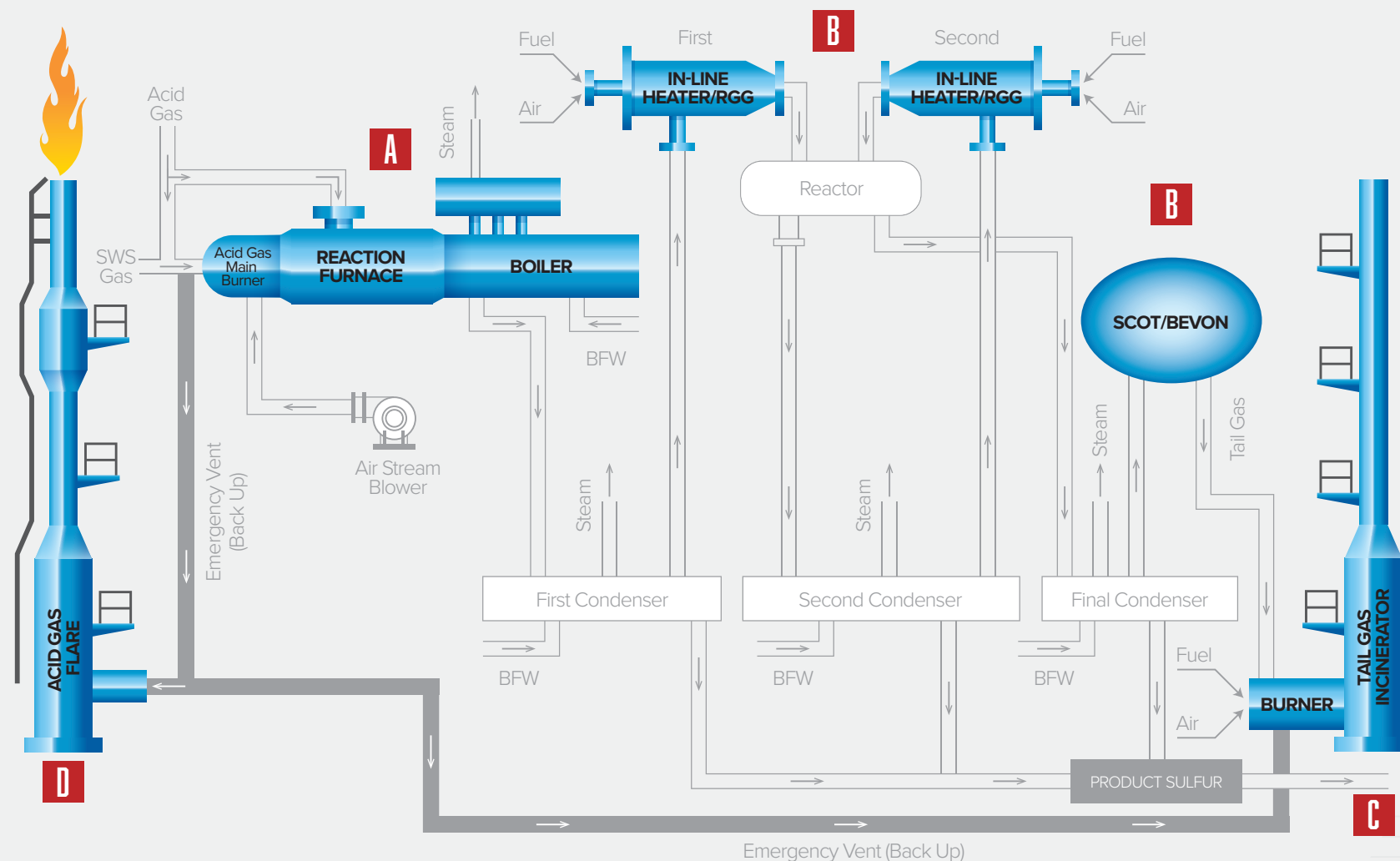
Equipment supplied by John Zink is shown in blue.

A Acid Gas (Main) Burner / Reaction Furnace

- Operates at sub-stoichiometric conditions
- High intensity burner
- Optimum H₂S / SO₂ ratio of 2 controlled by air flow
- Minimum reactions furnace temperature 982°C (1800°F)
- H₂S concentration from 35% to 90%
- Hot shell to prevent acid dew point corrosion
- Turndown range up to 10-to-1, depends on acid gas pressure
- Acid gas containing ammonia or hydrocarbons
- Process defined by process licensor

B In-Line Heaters / RGG

- Burner operates at stoichiometric conditions
- Re-heaters are used before each Claus reactor
- Reheat temperatures typically between 190°C and 250°C (374°F and 482°F)
- Hot shell to prevent acid dew point corrosion
- Process defined by process licensor



C Tail Gas Incinerator / Burner

- Forced draft or natural draft burners
- Incineration temperature typically 650°C to 900°C (1202°F to 1652°F)
- Residence time typically 0.6 to 1 second
- Horizontal or vertical incinerator
- Optional waste heat recovery
- Stack height dependent on local conditions and environmental regulations
- Low NO_x burners available
- Low excess air
- Low fuel consumption
- Incinerator design in-house

D Acid Gas Flare

- Maintains combustion stability of low heating value acid gasses
- Minimal utility costs using proven purge seal technology
- Priority windshield designs reduce flame pull down
- WindPROOF™ pilots for up to 160mph wind
- Flame monitoring with automatic ignition control