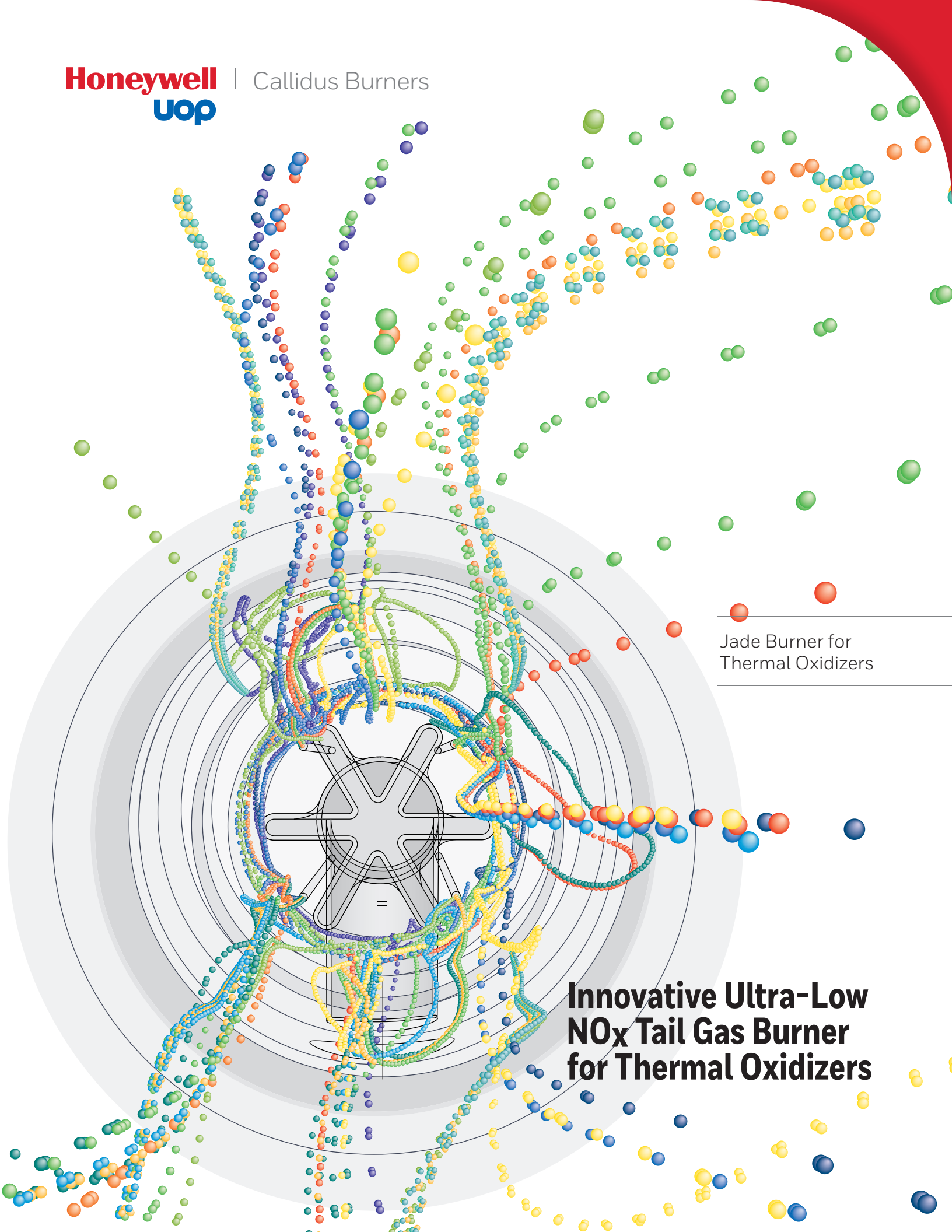
Honeywell UOP | Callidus Burners



Jade Burner for
Thermal Oxidizers

Innovative Ultra-Low NO_x Tail Gas Burner for Thermal Oxidizers

A Balanced Approach to Thermal Oxidizer Design

The Jade Burner from Honeywell UOP Callidus is the first ultra-low NOx tail gas thermal oxidizer burner designed and built specifically to deliver ultra-low NOx emissions with no special physical or operational requirements. In many cases, incorporating the Jade burner into a thermal oxidizer results in the lowest nitrous oxides (NOx) and carbon monoxide (CO) emissions a thermal oxidizer can produce.

The purpose of a thermal oxidizer is to combust (oxidize) various organic or inorganic compounds from other processing units. Waste streams may be comprised of a combination of materials. Tail gas from a sulfur recovery unit, flue gas from an FCC unit, and similar low calorific content waste gas streams are usually comprised of large proportions of inert constituents such as: nitrogen, carbon dioxide and water vapor. A low calorific value gas stream can be used to lower a burner's flame temperature by mixing the waste gas stream with a portion of the fuel gas (staged gas) prior to combustion.

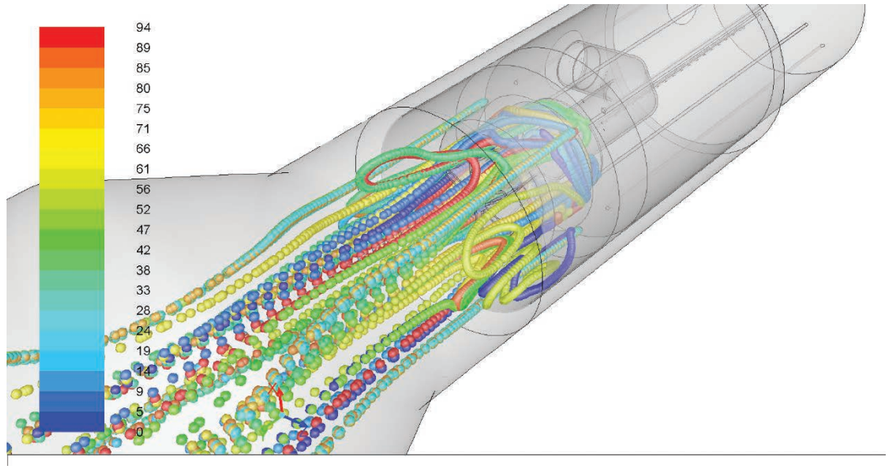
Lowering the burner's flame temperature and "inserting" the fuel stream reduces overall NOx emissions.

Introducing Balanced Staging

The Jade burner uses patent pending balanced staging to reduce or eliminate many of the limitations of previous technologies. While others have considered various methods and locations of waste or fuel gas staging, the Jade's balanced staging utilizes a combination of these to optimize combustion and lower emissions. The Jade burner splits the waste gas stream into two portions, delivering the gas in an annular gas at the periphery of the burner and through the center of the burner.

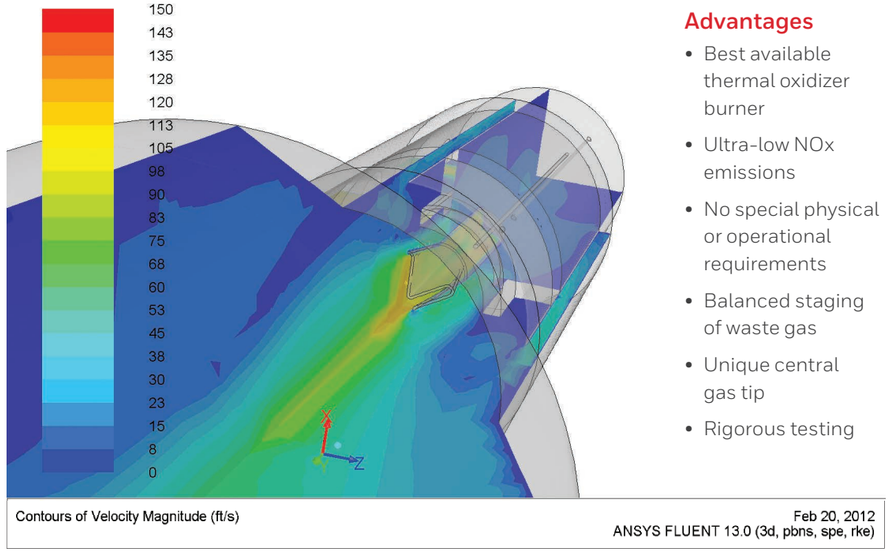
By injecting a portion of the waste gas into the throat of the burner and premixing it with the combustion air, the Jade effectively reduces the oxidation of nitrogen in all principal NOx forming mechanisms: thermal, prompt and fuel. This method of tail gas staging is largely unique to the Jade. The Jade burner also stages the assist fuel to create primary and secondary flame zones.

Another characteristic of the Jade's balanced staging is the customized positioning of the staged fuel gas tips relative to the central air stream and the outer waste gas stream. The staged tips may be placed anywhere, from outside the burner within the oncoming externallystaged waste gas stream to inside the burner within the internal combustion air stream. The design is tuned to each customer's specific requirements. The Jade burner minimizes NOx emissions without causing increased emissions of CO, UBHC or VOC. The Jade is factory-set by Callidus and does not need field adjustment or special operating practices.



Balanced Staging

- Split waste streams
- Waste gas delivered to burner periphery and burner throat
- Pre-mix waste gas and combustion air
- Staged assist fuel
- Custom positioning of fuel gas tips
- Rugged high-energy igniter



Advantages

- Best available thermal oxidizer burner
- Ultra-low NOx emissions
- No special physical or operational requirements
- Balanced staging of waste gas
- Unique central gas tip
- Rigorous testing

The Jade burner incorporates a lobed gas tip to introduce the waste stream into the central air stream and to optimize rapid mixing and emissions reduction. A simpler gas tip design can be used when slower mixing is desired. Variations of these designs are considered when optimizing the tip for specific cases. Mixing rates and means of achieving those rates are custom design considerations that are critical to proper performance. While burners not tuned by this strict design criteria may function, they are likely not optimal for a given waste gas composition, flow rate and temperature.

The Jade burner's balanced staging design variables have been optimized with thorough physical testing and virtual experimentation. Through this process, Callidus has been able to simultaneously optimize:

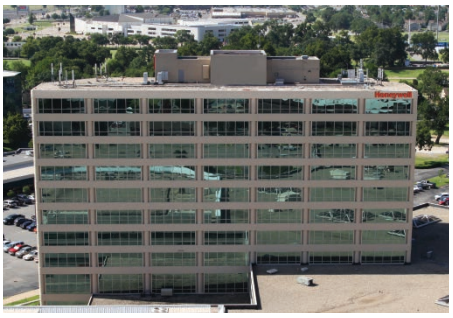
- Assist fuel consumption;
- Flow stream pressure loss;
- Combustion chamber temperature;
- NOx, CO, UBHC and VOC emissions;
- Combustion chamber size;
- Excess air;
- Residence time and
- Destruction efficiency
- Jade Advantages

By being specifically designed for thermal oxidizer service, the Jade avoids potential pitfalls of using burner designs intended for other services in thermal oxidizers. One potential pitfall is that while waste gas can be low in calorific value, it is not flue gas. Burners that rely solely on high levels of flue gas recirculation may deliver very low NOx when a waste gas such as tail gas is substituted for flue gas. However, the same burners may produce excess CO, UBHC or VOC emissions unless the residence time (size of the combustor) is greatly increased – an outcome predicted by simulation and confirmed by the rigorous Jade testing program. In order to control the CO, UBHC and VOC emissions from misapplied burners in thermal oxidizer service, it may be necessary to modify the burner in ways that diminish the burner's low NOx performance.

The Jade design addresses these limitations through the technical innovations of balanced staging and lobed mixing. A Jade burner performs in a stable and robust manner over the broadest range of operating conditions and efficiently at low excess air levels.

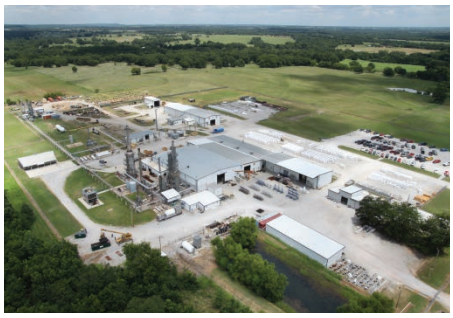
Conclusion

Rigorous design methodologies, patent-pending technology, and reliable, repeatable performance are the hallmarks of the Jade burner. Delivering ultra-low NOx emissions with no special physical or operational requirements is the Jade's promise.



Honeywell UOP Callidus headquarters - Tulsa, Oklahoma. USA

Honeywell UOP Callidus combustion test facility - China



Honeywell UOP Callidus 82,000 sq. ft. manufacturing and fabrication facility in USA

Global Coverage

Honeywell UOP Callidus reaches the global market through our headquarters located in Tulsa, Oklahoma, USA, with regional direct sales offices and independent sales representation around the world. Meeting our customers' expectations and setting the standards for the combustion industry have always been our goals. Each burner, flare, thermal oxidizer and catalyst system we design and manufacture is built with those goals in mind.

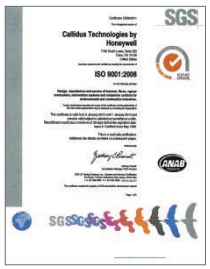
Test Facility

Honeywell UOP Callidus test facilities in the U.S. and China are used for combustion technology research and development, as well as for customer demonstrations. Our array of test systems allow us to closely match actual field operating conditions, providing results that will more accurately predict actual measured performance.

In Addition to Jade Burners, Honeywell UOP Callidus Offers:

- Ultra-low NO_X burners
- Flares, flare systems and flare gas recovery systems
- Thermal oxidizer systems
- Field services and parts
- CFD Modeling
- Training and schools

ISO 9001:2008 Certification



USA Certification

China Certification

High-Performance Combustion Solutions
Service – Parts – Installation

Contact us–we're here to help.

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For more information

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