

# COOLSTAR®+ FOR ETHYLENE

## NEXT-EVOLUTION PROCESS BURNER

### Next-level performance. *Plus* easy integration.

The new COOLstar®+ process burner from John Zink combines the proven reliability of a trusted platform with innovative technology to raise the bar for combustion equipment performance. The easy-to-retrofit design unlocks increased unit productivity and reliable low NOx emissions control without the need for costly system overhauls.

This evolution in process burner equipment delivers stable operation across a broad range of diverse gas blends and operating conditions, while design enhancements increase fired duty density, improve burner reliability and minimize downtime and maintenance cost. For operators who want to do more with less, COOLstar®+ maximizes long-term value through sustainable innovation.

### THE ULTIMATE COMBUSTION UPGRADE

With thousands of installations worldwide, the COOLstar® brand has earned a reputation for reliability and consistent performance. The new COOLstar®+ builds on that foundation with evolved technology to set new standards for combustion equipment:

- Increased fired duty that unlocks the potential to increase feed throughput and ethylene production
- Greater productivity and uptime with more reliable design
- Mitigates risks of NOx increases from fuel composition, combustion air temperature or fired duty changes
- Enhanced efficiency and excess air control with superior turndown capabilities
- Easy ULN burner revamp with a simple tile and tips swap for most staged fuel burner designs



### Enhancing Ethylene Production

To be competitive in ethylene production, plants need easy-to-integrate solutions for maximizing productivity and meeting more stringent regulatory standards for emissions. COOLstar®+ delivers reliable emissions control, plus higher fired duty density in a compact footprint, enabling ethylene facilities to boost capacity without costly expansions.

- No throat consumables
- Broad turndown
- Simple burner revamp
- Diverse fuel flexibility

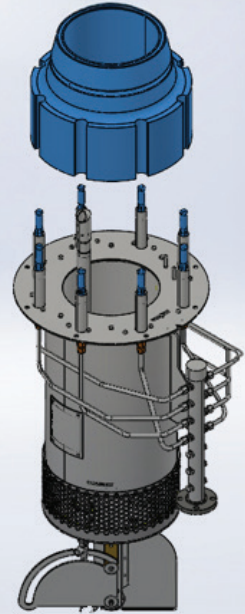
## + Seamless Retrofits and Integration

COOLstar®+ is engineered to make retrofits and revamps easy with a compact footprint and adaptable design. Built for compatibility with its predecessors, this technology can easily fit in existing layouts without additional infrastructure changes, minimizing cost, downtime and complexity during installation.

**No added controls complexity** streamlines integration into typical burner management systems, reducing installation complexity and costs.

**A single fuel connection** simplifies the installation process and reduces the need for costly equipment.

**Removable gas tips** allow for ease of maintenance and installation.



Tile and tip replacement on an existing ULN burner.

## + Enhanced Emissions Control and Sustainability



Meeting strict regulatory requirements while also maintaining cost-effective operations is critical in petrochemical operations. COOLstar®+ brings these priorities into balance by combining industry-leading technology and reliability with enhanced emissions control. With lower NOx emissions, tailored flux profile to meet application needs and excellent performance during turndown operations, this new process burner improves sustainability without requiring extra emissions control equipment or sacrificing unit productivity.

**Complete fuel staging** reduces NOx emissions through maximized Internal Flue Gas Recirculation (IFGR), improving flux performance and asset productivity while ensuring compliance.

**ARIA damper control** enables improved and intuitive excess air management, optimizing fuel efficiency and reducing emissions even during low-load operation.

**Targeted fuel distribution** and a flame anchoring point optimizes combustion atmosphere and minimizes emissions during startup and turndown operations.

## + Leading-Edge Equipment Performance

COOLstar®+ sets a new standard in combustion performance and asset productivity enablement. With a streamlined design that simplifies maintenance, minimizes costs and improves flexibility, COOLstar®+ helps end users achieve more with less.

**Reliable fuel flexibility** delivers stable operation across diverse fuel blends, including 100% hydrogen and natural gas.

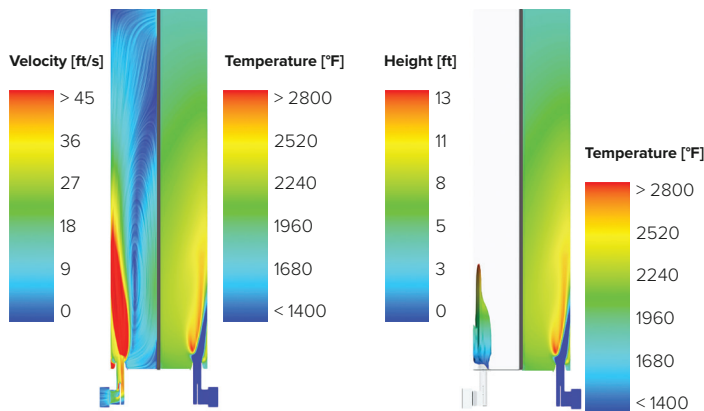
**Reduced fuel manifold complexity** simplifies fuel system requirements, improving adaptability and ease of maintenance.

**Optimized airflow uniformity** delivers consistent air distribution, resulting in stable and consistent flame performance.

**Broad turndown ratio** improves burner efficiency across varying operating conditions to improve operational flexibility.

**Reduced dependence on consumables** improves operational reliability while minimizing maintenance costs and downtime.

### CFD evaluation of flue gas velocities (left) and temperature (right) of a radiant box.



Optimized flame shape and heat distribution allows for improved performance.

Category	Challenger	Round Flame		Flat Flame
	John Zink COOLstar®+	John Zink COOLstar®	Market Alternative	Market Alternative
NOx emissions [ppm]	<35	50 – 80	<35	<30
Increases fired duty density post retrofit	✓	✗	✗	✗
Reduced muffling required for high H2 firing	✓	✗	✗	✗
Airflow uniformity and excess air control at turndown	✓	✓	✗	✗
Retrofits into existing burner models	✓	✗	✓	✗
Crack mitigating tile/ burner design	✓	✓	✗	✓
Reduced fuel system maintenance & complexity	✓	✓	✗	✗
Reduced dependency on consumables in burner throat	✓	✓	✗	✗
Broad technology installation base	✓	✓	✓	✗
Heat concentration at brick wall base	Lower	Lower	Lower	Lower
Fuel flexibility	✓	✓	✓	✓
Knowledge required for operation	Typical	Typical	Typical	Typical
ND and FD Compatible	✓	✓	✓	✓

## Built On Proven Reliability. Backed By John Zink Expertise

COOLstar®+ is ushering in the next evolution in combustion performance with innovation that operations can trust. That's because it's founded on the success of COOLstar® process burner technology, which has thousands of installations world-wide.

And it's backed by the industry-leading field expertise, responsive service and technical support of John Zink, ensuring consistent performance, minimized downtime and efficient emissions control.

As a Koch Engineered Solutions company and a global leader in combustion and emissions control, John Zink has more installed equipment than any other manufacturer in the industry. Backed by nearly a century of proven field performance and experience, we work with customers to tackle challenges and shape industries across the globe.



## Change The Equation For Combustion. Partner With John Zink.

Drive long-term value and success for your operation with the leaders in combustion and emissions control. The next-generation process burner is here to take combustion performance to the next level.

### Let's get started.

To learn more about COOLstar®+, visit: [johnzink.com/products/process-burners/coolstar-plus](https://johnzink.com/products/process-burners/coolstar-plus)



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

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