

Integrating EGF as the First-stage Flaring Solution

**A Proven Approach to Reduce
Flaring Impacts**

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LEADING INDUSTRIAL COMBUSTION SINCE 1929

As a global leader in emissions control and a pioneer in modern industrial combustion solutions, John Zink has a rich history of actively partnering with customers across a wide range of industries, providing comprehensive solutions to optimize their operational performance and ensure compliance with even the most stringent environmental regulations.

We form lasting partnerships by actively collaborating with our customers to understand their unique challenges, then deliver customized service, support and equipment solutions to help them meet their immediate needs and achieve their long-term goals

FOUNDED IN 1929

The John Zink company was established in Tulsa, Oklahoma, by John Zink, a chemical engineer working in the Oklahoma oil and gas fields who identified the need for safer and more efficient burners.

ACQUIRED IN 1989

The John Zink company was acquired by Koch, Inc., expanding its capabilities and resources in combustion and emission control.

DECADES OF INNOVATION

John Zink has continued to innovate and lead the way in combustion and emissions solutions, contributing significantly to the oil and gas, power generation and petrochemical industries.

Why Traditional Flaring Strategies are Being Challenged?

Impact on the Surroundings

Community impact :

- Visible flame / high luminosity
- Visible smoke
- Noise

Safety & operability

- Radiation footprint
- Sterile zone

Environmental performance

- Destruction efficiency
- Emissions



Why Traditional Flaring Strategies are Being Challenged?

Elevated Flares are Designed for Emergencies, but Operate Mostly in Routine Mode

Designed for peak relief, but operates most of the time at low/medium rates :

- High purge & assist medium (steam/air) demand
- Visible flame during normal operation
- Challenges to maintain smokeless across the full range of operation
- Challenges to maintain high DRE at turndown conditions

Enclosed Ground Flare Staged to an Elevated Flare

A Staged Flaring Architecture : Matching the Right Flare Technology to the Right Duty

EGF handles routine and low continuous reliefs “day to day operation”

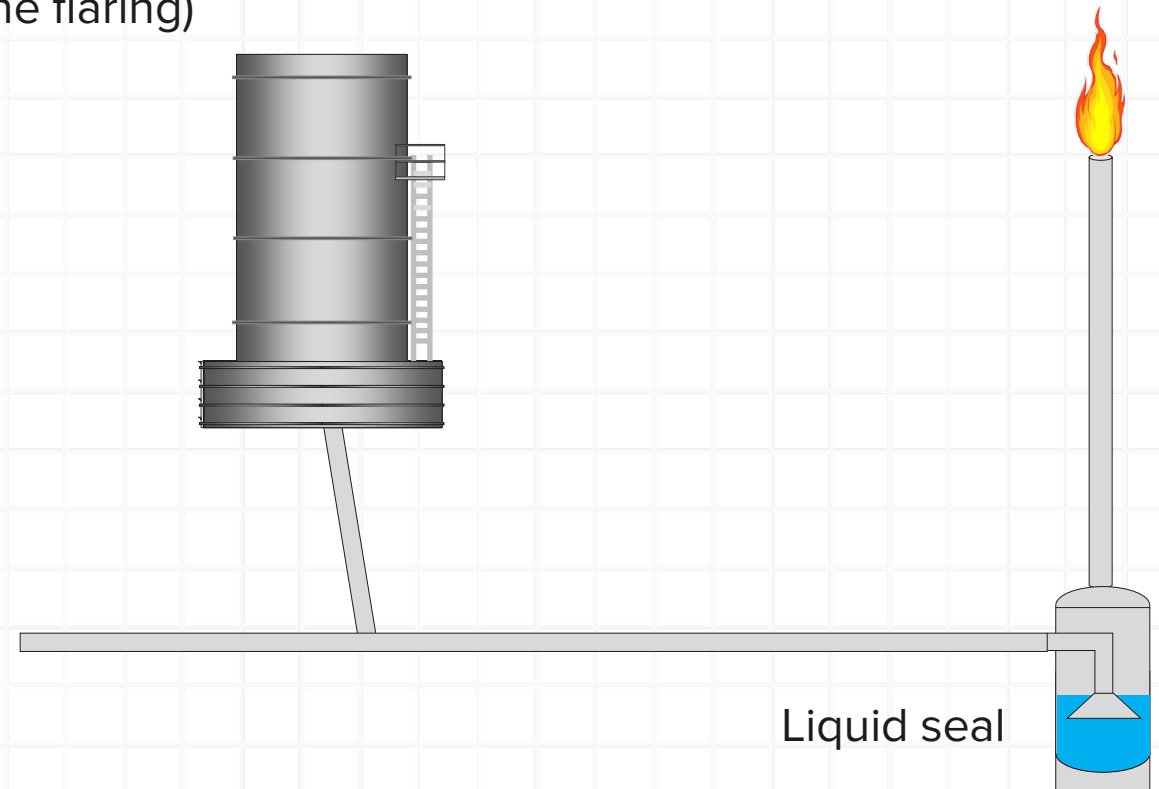
Elevated flare reserved for true emergency scenarios

Staged with a liquid seal or a staging valve

Stage 1 : enclosed ground flare
(routine flaring)

Stage 2 : elevated flare
(Emergency flaring)

Flare gas
from plant →



Staged Enclosed Ground Flare & Elevated Flare in Operation

Observed Behavior During Shutdown Flaring Conditions

Shutdown flaring handled by elevated flare



No assist steam



With assist steam

Shutdown flaring handled by EGF

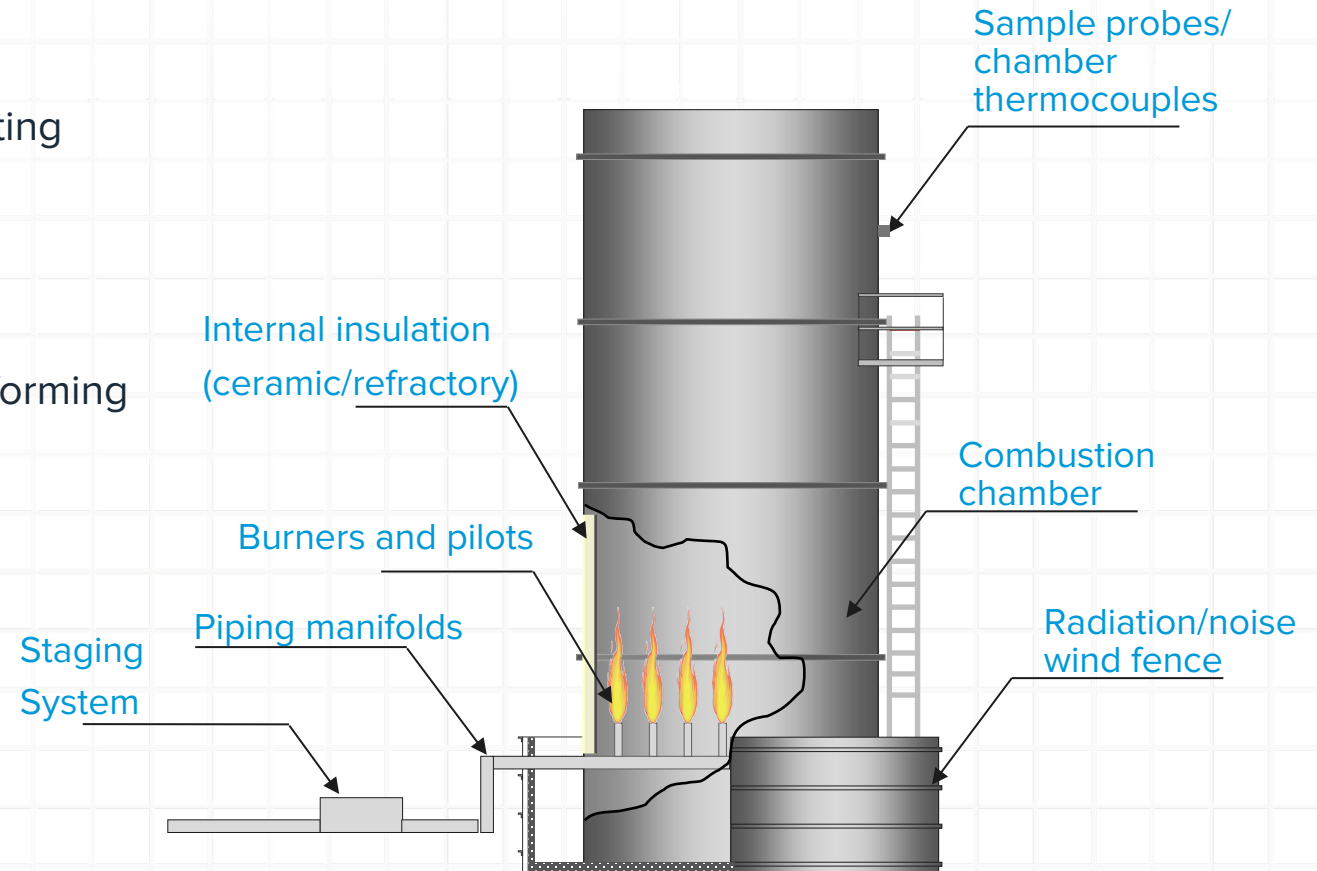


When routine flaring is handled by a first-stage EGF, visible flame, smoke, and assist demand are significantly reduced.

Why EGF is Better Suited for First Stage Duty?

Features and Advantages

- Smokeless operation across complete operating range
- Low noise
- Designed for online pilot maintenance
- Achieves high combustion efficiency, outperforming elevated flares
- No thermal radiation outside the enclosure
 - No visible flame
 - No sterile zone



Why EGF is Better Suited for First Stage Duty?

Features and Advantages



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Key EGF Design Parameters Drive Performance



Critical Parameters:

Firing direction : Horizontal firing vs Vertical firing

Burner Selection

Staging philosophy

Wind fence design



Design Factors:

Composition and pressure of the waste gas

Utilities available (steam, nitrogen, fuel gas)

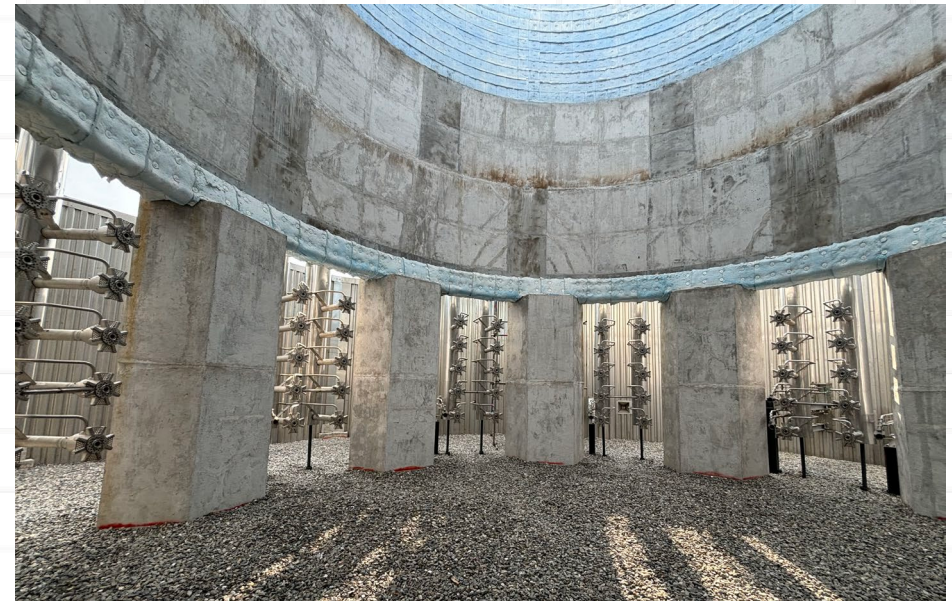
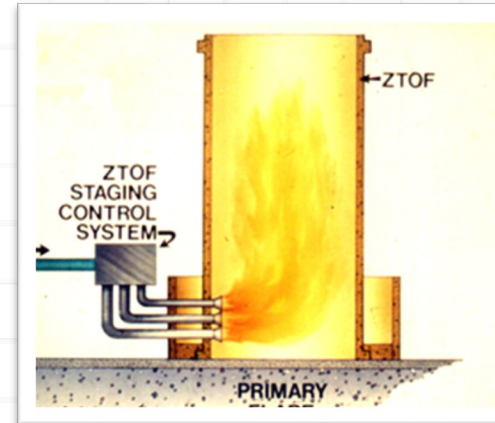
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Burner Arrangement

Firing Direction: Up Firing



Firing Direction: Side Firing



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Burner Design

Lean Burners



- Low Pressure
- Lean Streams
- Wide range of compositions

Spider Burners



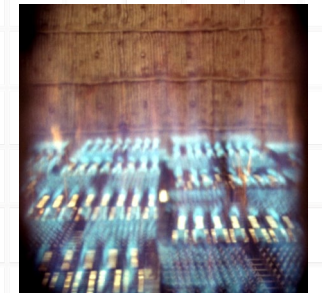
- High Pressure assisted
- Wide range of compositions

Steam Burners



- Steam assisted
- Low pressure gas
- Wide range of compositions

Laminar Flames / Fin Plate

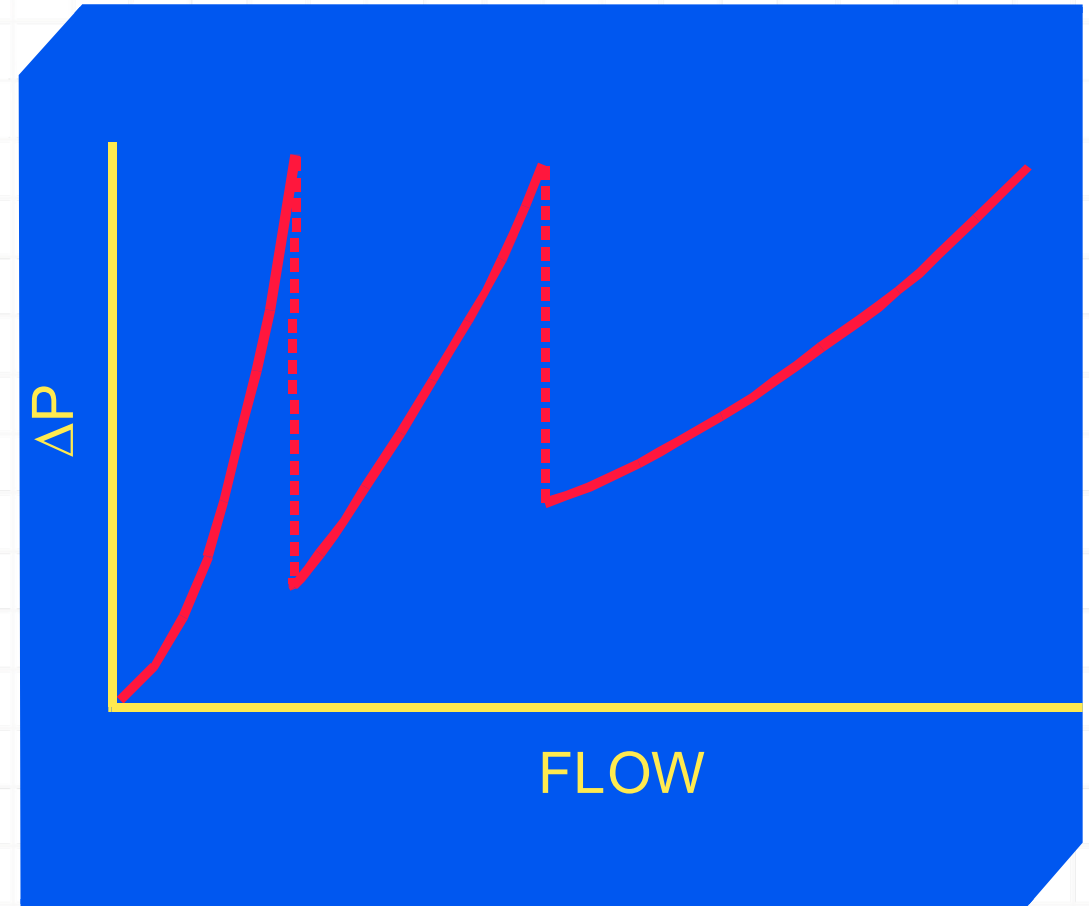


- Low Pressure without assist medium
- Extraordinarily increased air/gas interface
- Smokeless burning for a wide range of compositions
- Low luminosity (efficient combustion)
- Eliminates burner tube coking

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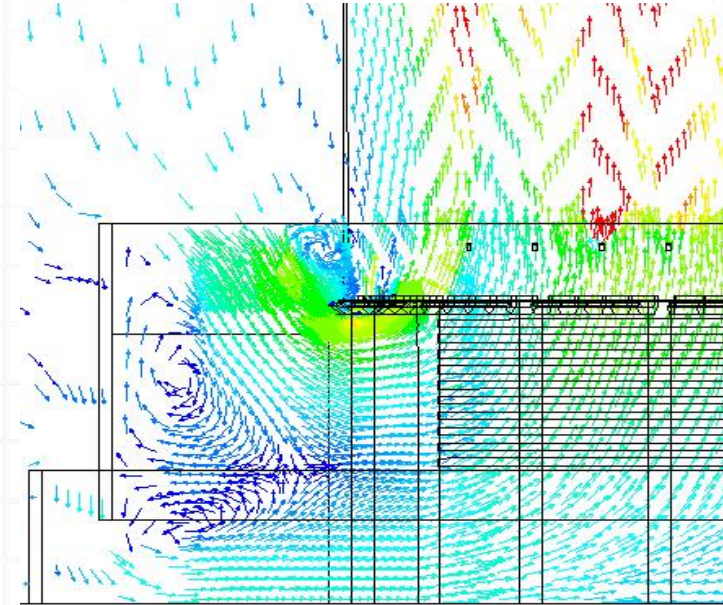
Optimized Staging Philosophy

- Defines the number of burners to be in operation at any time (stages)
- Minimize utilities consumption
- Optimize combustion efficiency
- Can impact performance:
 - Visible flame
 - Smoke



Enclosed Ground Flare

Adapted Windfence Design



First-stage EGF integration is not a future concept—it is a proven, field-operating solution

Any Questions ?



THANK YOU

