JOHN ZINK™
A KOCH ENGINEERED SOLUTIONS BUSINESS

VAPOR COMBUSTION SYSTEMS

Superior Performance, Proven In The Field

John Zink Vapor Combustion Units (VCUs) have been proven in numerous gasoline, crude oil, ethanol, diesel, and other hydrocarbon and petrochemical applications including:

- Truck and rail car loading
- Barge and ship loading
- Storage tank transfer and breathing
- Barge and tank degassing
- Reactors, dryers and other process vents
- Pipeline breakout stations
- Soil remediation and groundwater cleanup
- API separators and other wastewater vents

Efficient, Effective, And Easy To Use

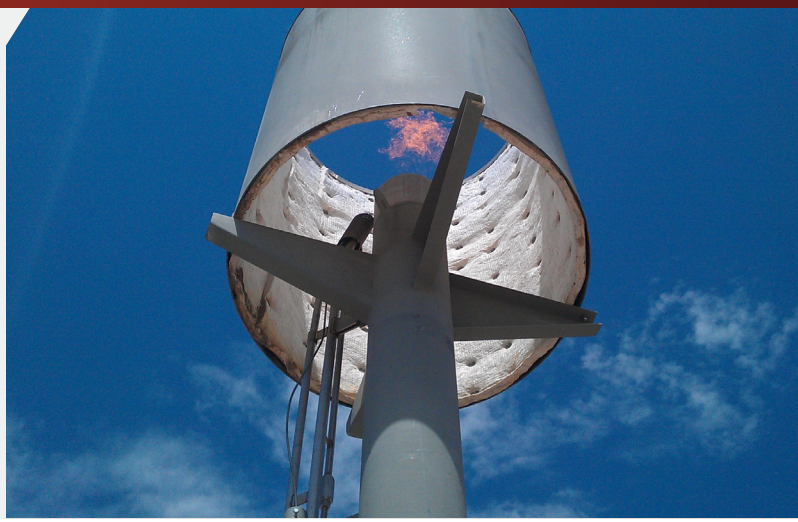
Our field-proven Vapor Combustion Units can achieve volatile organic compound (VOC) destruction efficiencies greater than 99.99 percent, resulting in hydrocarbon emissions less than 10 milligrams per liter of product transferred. In addition, our VCUs satisfy all the applicable requirements of 40 CFR 60.18.

Combustion is effective even on light hydrocarbons including methane and ethane. And unlike other technologies which may require substances such as refrigerants, coolants, lube oils, catalysts, adsorbents or absorbents that involve special handling and disposal procedures, our Vapor Combustion Units do not require any special fluids or materials for operation. As a result, John Zink VCUs are much easier to operate, with less hassle for plant personnel year-in and year-out.

Vapor experts: John Zink has more than 2,000 vapor combustion and vapor recovery installations worldwide.

DESIGNED TO DELIVER

With vapor control experience dating back several decades, we've earned our reputation as a leader in research and development, manufacturing, service and support, and more. As a result, you can rely on John Zink VCUs to deliver where it counts.



Proven

- Enclosed combustors completely hide the flame while combusting hydrocarbon vapors in a controlled manner.
- Temperature control reduces fuel consumption and achieves higher destruction efficiencies.
- Open-flame combustors are a low-cost alternative when a visible flame and its resultant noise and radiation are not concerns. Open-flame combustors are capable of destruction efficiencies of 98%.

Safe

- Detonation arrestors provide primary flashback protection. In marine loading applications, we work with the Coast Guard to provide a liquid seal exemption based on our proprietary burner and operating procedure.
- Anti-flashback burners allow safe combustion of explosive mixtures that are unsuitable for standard burners. These burners, manufactured at the John Zink facility, help prevent flashbacks and provide stable combustion over a wide range of flows and concentrations.
- Reliable, energy-efficient pilots, also manufactured at John Zink, provide a stable, continuous ignition source for the vapors.
- Burner staging logic ensures safe combustion.

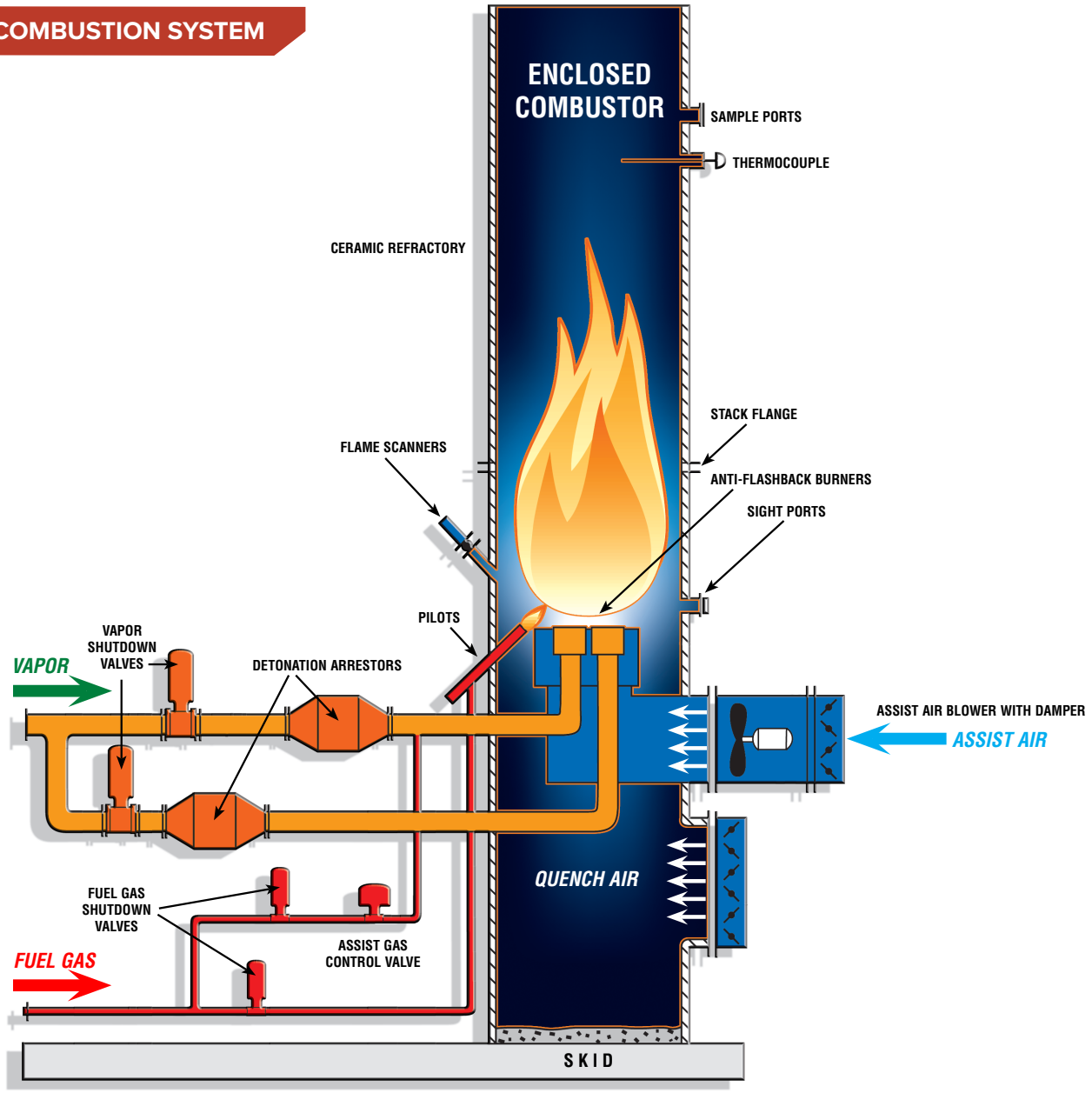
Efficient

- VCUs available in highly efficient low-NOx configurations.
- Our Vapor Equalizer™ for gasoline or distillate vapors can reduce or eliminate auxiliary fuel usage by collecting gasoline vapors when rich, enriching vapors when lean, and averaging out vapor concentrations.
- A separate assist gas burner reduces fuel use for inert vapors, especially when vapors are lean.
- Premixing fuel with highly-oxygenated lean vapors can reduce fuel gas usage.
- Staged combustion and multiple assist air blowers reduce the amount of fuel gas required for higher turndown requirements.
- A stable burner design allows emission requirements to be met at lower operating temperatures, reducing fuel consumption.

Flexible

- Skid mounted components reduce field installation time and cost. An enclosed stack can be flanged with the lower section skid mounted to save you even more.
- A vapor blower package can be provided in cases where the vapors have insufficient pressure. A single integrated system transfers and combusts the vapors.

VAPOR COMBUSTION SYSTEM



1. A local or remote start signal is received, starting the assist air blower to purge the combustor of any existing combustibles.
2. After the purge, the pilot ignites and must be confirmed by the flame scanner in order for the operation to proceed.
3. Vapors pass through the vapor shutdown valve and detonation arrestor to be introduced into the combustor through the anti-flashback burners and are ignited by a pilot.
4. Large systems introduce the vapors into the combustor in stages to achieve higher turndown and optimum performance.
5. An assist air blower provides a portion of the combustion air and mixing energy to ensure smokeless combustion of the vapors.
6. The assist gas control valve and quench air dampers modulate independently to maintain the combustor temperature.

EQUIPMENT RENTAL

To keep you up and running during installation, retrofitting or maintenance, we offer equipment rental including the PECS® (Portable Emission Control System), a self-contained, trailer-mounted vapor combustor that ensures stable, smokeless combustion and maintains temperature control over a wide range of vapor combustion.

PECS

Bundle a PECS rental with other John Zink services such as installation, startup, on-site operator assistance and training, or dismantling to save both time and money.

WORLDWIDE SUPPORT

The John Zink worldwide service organization is the largest, most technically savvy team of its kind. Our service technicians are trained in the latest technologies to evaluate existing systems for upgrades and retrofits, to troubleshoot operations, and to help plan your next turnaround. Our experts are available on emergency call-out 24/7. We also provide comprehensive courses held at the John Zink Institute℠. These courses help operators and engineers optimize their equipment and address issues at their facilities.

GLOBAL REACH

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

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