

## Real Time Remote Flare Monitoring Technology.

Day and night, the ZEECO® FlareGuardian flame monitor utilizes the patented Video Imaging Spectro-Radiometry (VISR), a real time multi-spectral imager, that directly, autonomously, and continuously measures combustion efficiency (CE). It also monitors and reports a flare's smoke index to indicate levels of smoke produced from the flare flame. This monitoring capability allows FlareGuardian to control any assist medium (steam, air, or fuel gas) to achieve smokeless flaring. FlareGuardian monitors a flare's flame footprint, stability, and heat release as added flare flame analyses. FlareGuardian's VISR technology removes the need for indirect surrogate parameters such as Net Heating Value Combustion Zone (NHVcz), Dilution Net Heating Value (NHVdil), and Maximum Allowable Velocity (Vmax).

This single instrument eliminates the capital costs of separate instrumentation for continuous gas composition analysis, flow monitoring (flare gas, steam, and air), pilot monitoring, visible emissions monitoring, and the associated maintenance, manpower, and operating costs for each. Based on VISR's unique multi-spectral Infrared (IR) imager, FlareGuardian uses a high frame rate, high spectral selectivity, and high spatial resolution over a fast data acquisition cycle of 33–100ms.

## Auto Adjust, Minimize Costs, and Meet Regulations.

Zeeco's FlareGuardian eliminates inaccuracies and delayed results inherent to indirect flare monitoring. Rather than determining compliance and combustion efficiency through a time-consuming, repetitive process of measuring inputs, assuming reactions and velocities, and arriving at an assumed operating status, FlareGuardian directly monitors flare performance in real time. When required, the FlareGuardian system automatically adjusts supplemental fuel additions, as well as any assist source (gas, steam, or air) via a closed-loop control system – lowering costs for supplemental fuel and maintaining more accurate destruction efficiency. FlareGuardian is remotely-mounted for non-contact monitoring that eliminates maintenance costs versus indirect monitoring methods that require sensors to be in contact with harsh, often corrosive flare vent gases.

## Zero Maintenance. Zero Calibration.

FlareGuardian allows the user to meet industry standard combustion efficiency and visible emissions while optimizing flare performance. The ability to monitor flare performance in real time eliminates determining compliance and combustion efficiency through indirect methods. In addition, FlareGuardian's easy installation and maintenance means there's no need to interrupt your plant's production processes.



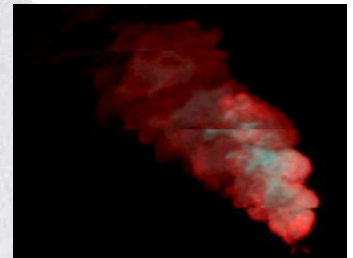
*FlareGuardian directly monitors flare performance*

## Design Features and Benefits:

- Provides real-time combustion efficiency, smoke index, flame stability, flame footprint, heat release, and pilot status for a complete picture of flare performance
- Autonomous data collection (DCS or PLC) for optimized flare performance
- Simplify EPA monitoring, reporting, and compliance activities
- Patented technology
- Remote mounted, non-contact monitoring
- More accurate results versus indirect monitoring
- Smoke index allows control of assist medium to achieve incipient smoke
- Eliminates need for monitoring surrogate parameters
- Short measurement cycle (milliseconds, averaged over seconds to 1 minute) enables quick response and minimizes cost for supplemental fuel, steam, or air
- Industrial interface allows for closed loop flare operation and control based on direct combustion efficiency and smoke index values
- Easy installation and maintenance, uninterrupted production processes, and no calibrations



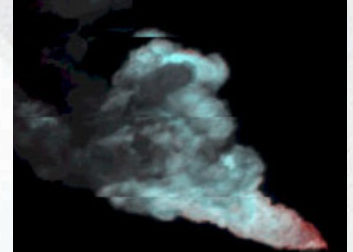
Visible Image of  
Properly Operated Flare



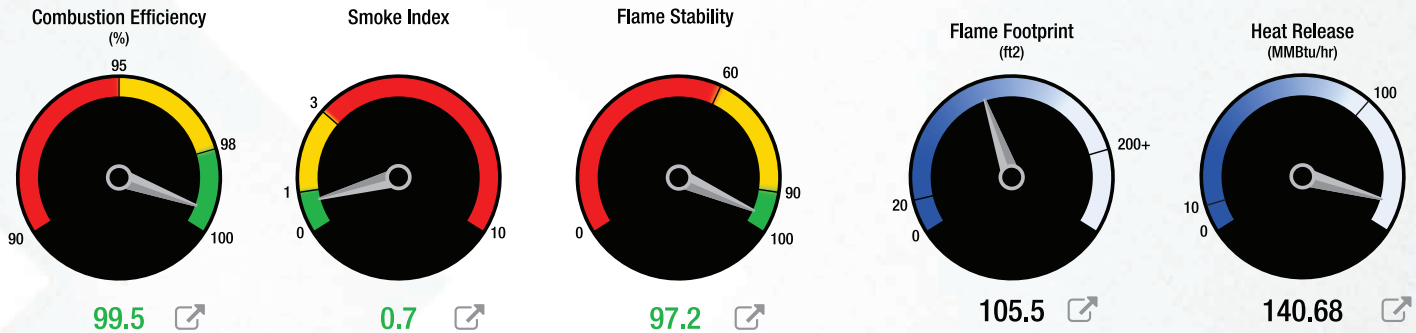
FlareGuardian™ Image of  
Properly Operated Flare



Visible Image of  
Smoking Flare



FlareGuardian™ Image of  
Smoking Flare



For illustration purposes only. Actual parameters can be adjusted based on flare design and process conditions.



## The Zeeco Difference

By concentrating on what we do best, Zeeco has grown into a worldwide leader in combustion and environmental solutions. We are a privately held company whose ownership stays highly involved in daily operations, with upper management comprised of the world's leading combustion experts.

When you call Zeeco, we answer. When you make a request, you get a quick, efficient response. We are lean and efficient, able to make decisions quickly, without bureaucracy and red tape. Our sales, engineering, and purchasing groups work hand-in-hand to deliver highly competitive quotes and heroic turnaround times. We stand ready and willing to travel anywhere in the world to discuss upcoming projects firsthand, and to ensure that every existing project runs seamlessly.

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