

METHANE FROM FLARING TOOLKIT



Measure Efficiency: Permanent IR Systems

Can I measure flare efficiency? > Measure Efficiency: Permanent IR Systems

Summary

A permanent IR system provides automatic monitoring of the flare system to ensure a reliable operation at all times. It is an optical system based on a real-time measurement of the wavelength of a distance source. Permanent IR can be applied to various flare types and sizes. Typically it is used to ensure functionality of the flare or pilot from a safe distance and is not a direct measurement of methane emissions, but changes in the flare performance may be indicative of changes to the efficiency.

How it Works

- Distant optical measurement of wavelength of a source
- An IR sensor is set to a wavelength in which energy from the flame is visible
- If the IR sensor reaches the threshold of the infrared energy associated with a flame, it means that the pilot flare is lit
- If the IR energy falls below this threshold, the area may still be hot but there is no longer a flame present

- Detection of the absence of a flame will trigger an alarm

Advantages

- ✓ No direct access/physical contact to source required
- ✓ Reliable 24/7 operation for monitoring gas flares by proven technology
- ✓ Distances up to ¼ mile (400 meters) or even more possible
- ✓ Applicable for various flare types: ground flares, elevated flares, offshore, staged
- ✓ Immediate detection of extinguished pilot or permanent flames with direct alarming for quickest possible flame restart or stop of the gas flow
- ✓ Installation in safe distance of the flare
- ✓ Operates in range of conditions, day & night
- ✓ Easy access for maintenance
- ✓ Easy to install and upgrade existing facilities, scalable
- ✓ Installation of a pan-tilt system can allow for

monitoring of more than one flare at a time

Limitations



Not a direct measurement of methane emissions



Needs a clear line of sight



Does not provide any detailed information about the quality of combustion but rather only the operational status (on/off)



Some limitations in severe weather conditions (e.g. heavy fog/heavy rain)

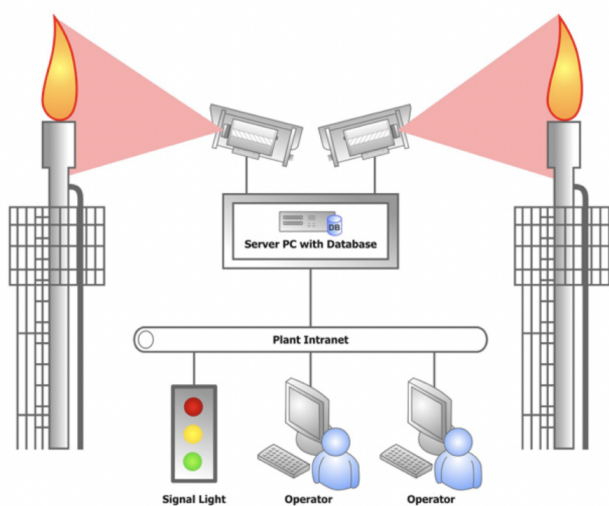
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- [Vendor website: Automationtechnology](#)
- [Vendor website: Visiontir](#)
- [Vendor website: Tempsens](#)
- [Article: Lumasense](#)

Case study

In a facility with two flare stacks a permanent IR system is installed. The pilot of each flare is monitored by an individual IR camera which is mounted in a safe distance to the flare as illustrated in the figure below. Its location close to the ground provides easy access for maintenance operation. The signals from the cameras are linked to a server with database and a web server. Information is then transferred to the plant intranet which feeds a signal light to show the operational status. The information is also accessible from the operations room. This setup ensure the continuous operation of the pilot and enables the operator to react quickly on any problems encountered.

Image courtesy of Automation Technology

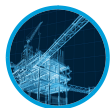


Typical setup for a permanent IR system for flare monitoring [Automation Technology]

Can I measure flare efficiency?



Measure Efficiency: Predictive Feedback and Control



Measure Efficiency: Flare Simulations



Measure Efficiency: Drone equipped with single methane sensor



Measure Efficiency: Aerial measurement of flare efficiency



Measure Efficiency: Extractive method for determining flare efficiency