



Can I identify a flare with a performance issue: Alarm systems – Flame Ionisation Detection

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Summary

There are a range of flare monitoring systems to detect and alarm if the flare is unlit. Each technology utilises a feature of the flare such as heat or light. Flame Ionisation uses ionization of the gas during combustion to generate a measurable current.

In some countries, to comply with environmental regulations it is essential to confirm that the main flare or pilot flare always remains lit.

Where cold flares are in operation (where emissions can vary between vented gas and combusted gas) the inclusion of alarm systems can help identify what operating state the system is in.

How it Works

Flame status can be determined by several means including monitoring heat, ionized gas, light or sound. To give constant feedback of pilot status one of the following systems will need to be used:

- Heat – Thermocouples
- Ionised Gas – Flame ionisation detection
- Light – IR or UV systems
- Sound – Acoustic systems

Whilst standards such as API 537 require the use of pilots in the flare, they re not globally applied. There are a large number of facilities that operate without pilots.

For choosing properly the flame monitoring system, it is important know if it will supervise a pilot flame or a flare flame.

High-tension ignition systems generally use flame ionisation detection for flame monitoring as they can utilise the same cable for ignition and monitoring. The weak point of this type of monitoring is providing adequate protection of the ignition/detection cable.

Flame monitoring systems comparison:

Technology	Individual pilot	Ground level Maintenance	Instantaneous response
Thermocouple	X	X	
Fiber Optic	X	X	X
Optical at grade		X	X
Acoustic	X		X
Flame ionization	X		X

Comparison between fiber optic detection and Thermocouple detection (From Zecco)

Advantages

- ☒
- Has instantaneous response



Allows flare with multiple pilots to be monitored individually

Limitations



Is not possible to maintain from the ground.

Go Deeper

- [Vendor video](#)

Case study

Video of flame ionization detector technology

[Honeywell UOP Flare Pilot Flame Ionization Detector](#)

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