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Using infrared monitors to achieve auxiliary flare pilot monitoring (TIA)

Infrared flare pilot monitoring as a primary or secondary monitoring solution provides a pilot status signal when thermocouple failures occur and assures an alternative pilot status measurement is available for the safe flare operation.

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Article Summary

Thermocouples don't always last the duration of the planned operational life between scheduled flare maintenance turn arounds. A major benefit of implementing an additional infrared pilot monitoring system is that it is isolated from the process and can be installed without removing the flare from operation.

Infrared solutions, such as pyrometers, can provide pilot confirmation signals but also have optional uses that can monitor different flaring conditions. For single elevated flare stacks, the pyrometer monitoring system can be installed as an after-market monitoring solution for both pilot and flaring monitoring.

Gas assist flares can also benefit from a pyrometer solution with implementation of a proportional 4-20mA output that represents the flaring intensity of a flaring event. With a proportional output that represents the flaring flame size and intensity the operator can maintain a flame and assist gas levels appropriate to the requirements of the feed gases to maintain proper flare operation in real time or alarm for conditions outside proper operational levels.

Staged flare systems can also be monitored with pyrometer systems using the proportional 4-20mA output. The pyrometer will require a field of view that includes the entire flare tip and all flare stages. Each stage condition will have its own signal level output from the pyrometer based on the stage level being flared. These levels can be logged into the DCS system to provide conditional monitoring to the operator.

Ground flare arrays can benefit from an infrared pyrometer monitoring solution by using the system to provide pilot status at multiple pilot locations across a flare array system. Additional points can be targeted on the array using an infrared pyrometer system to confirm the array is flaring at the proper points in the array that represents the pressure of the feed gas assuring proper flare operation signal to the operator.

Infrared pyrometers designed for flare monitoring require a wide assortment of optical options to meet a wide variety of installation locations and flare types. Requirements range from high resolutions to monitor small pilot flames at large distances or wide-angle optics to assure larger staged flare tips can be monitored.

Environmental protection is required for installation of the pyrometer to meet environmental site conditions to protect the pyrometer from environmental moister and dust. This includes protection from ambient limit protections. The typical pyrometer system has a working ambient limit of -40°C to 55°C and cooling or heating options should be available for ambient temperatures outside this range from the pyrometer manufacturer.

Hazardous area requirements for an infrared pyrometer system is a normal product requirement and normal certification levels are either intrinsically safe or flame proof type protections. Purging systems are normally not preferred due to their higher cost of operation and maintenance requirements.

The signal conditioning for a flare stack pilot monitoring system should include an operator configurable alarm delay of two seconds to two minutes. This delay circuit reduces false alarms due to wind, rain or other weather conditions from alarming during short duration loss of signal and only alarm for a loss of signal that is over the operators set alarm delay setpoint. This limits false alarms going to the DCS that are only short duration loss of signal due to weather conditions and not actual pilot loss.

Many conditions can affect the performance of an infrared pyrometer flare monitoring systems performance and many of those conditions can be limited by proper installation of the monitoring system. Location should be as close to the flare tip as possible without getting so close the flare tip blocks the view of the monitor. This is normally at a viewing angle of 45 degree, so the pyrometer stands off enough to see over the top of the flare tip but close enough to reduce environmental ambient weather impact on the signal reaching the pyrometer.

Please feel free to contact the LumaSense experts who are available to help with all your flare monitoring requirements. They will draw on their 25 years of flare monitoring expertise to design and instruct operators on proper installations for a reliable infrared flare monitoring solution.

This short case study was originally supplied for PTQ's Technology In Action feature - Q3 2018 issue. For more information: **j.coponen@lumasenseinc.com**

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