



Using a Calorimeter to Measure Heating Value in Flare Stacks

In the industrial environment proper flare stack design is essential to handle multiple waste streams for maximum destruction performance with minimum emissions. Since destruction efficiency and emissions are important criteria to consider when designing a flare, when the design is done correctly, dramatic operating savings will also be realized.

Waste streams are collected from the different processes and sent to the flare stack for destruction. Continuous monitoring of the waste stream is necessary to identify the minimum heating value and ensure proper combustion efficiency. In addition, by identifying the minimum heating value it can be determined whether the waste stream can be used as a standalone fuel source.

Micro-combustion calorimeters provide a direct measurement of heating value. Fuel is premixed with the process sample and completely incinerated by a carefully metered flame. A thermocouple measures changes in the flame temperature. An increase in the temperature is directly proportional to the heating value. This analyzer provides a continuous, direct measurement of the heating value with a very fast response time. It has a universal response and is not susceptible to flameouts or pressurized systems.

Control Instruments' CalorVal BTU Calorific analyzer is a micro-combustion calorimeter. Because of its unique construction and operating technology, it is the optimum analyzer for directly measuring the heating value of varying waste gas streams for flare stack applications. Rugged and reliable, the CalorVal is built on a time-tested field proven design, capable of withstanding the rigors of the flare stack environment.

Mounts at the Base of the Flare

The CalorVal is a compact, lightweight design suitable for field mounting on a freestanding rack or close proximity to the sample tap point/location, with no shelter required. This eliminates long & expensive heated sample lines and the need for a pump or other sample conditioning components. Mounting at the sample point decreases the sample transport delivery time resulting in the fastest response time possible. This

allows the CalorVal to quickly respond to the flare stack heating value and adjust its fuel source as needed.

Fully Heated Assembly/Simple Flow System

A fully heated assembly prevents condensation of water vapor and other heavier less volatile hydrocarbons. Keeping all sample wetted parts of the sampling system and analyzer at a high temperature will ensure that all combustible vapors are properly measured, eliminating inaccurate readings. The sample stays intact during measurement.

The analyzer further avoids condensation and maintenance problems through its simple flow system. The CalorVal collects the sample using an aspirator-driven system. There is no pump or other moving parts. This simple and extremely effective design requires very little maintenance, and its performance is unaffected by water, corrosives or other compounds in the sample stream.

Direct Measurement/Universal Response

The CalorVal was developed to directly measure the total heating value. The proprietary technology provides the ability for the analyzer to accurately measure a variety of combustible gases even though the analyzer was calibrated on one specific gas, giving excellent cross calibration accuracy and minimizing reading errors.

The CalorVal gives a uniform response to a wide range of combustible gases and vapors, including heavy hydrocarbons, carbon monoxide, hydrogen and numerous other compounds found in waste gas streams.