

# IN CONTROL

A Newsletter From Control Instruments Corp

## The CalorVal Obtains Approvals

Control Instruments Corporation's CalorVal BTU Analyzer has received both FM and ATEX approvals worldwide. This product monitors the heating value and energy content of flammable solvents and combustible gases in the BTU range, to measure alternate fuel supplies.

The CalorVal is a micro combustion type calorimeter that directly measures the calorific value of gases. It has a uniform response to a wide variety of combustibles, and is not poisoned by process contaminants, water, corrosives, or organo-metallics. Its industrial strength design allows quick and reliable monitoring and control of waste gas streams and advanced combustion equipment. It is in recognition of these exclusive features, that the CalorVal BTU Analyzer was declared compliant with ATEX Directives and given FM United States & Canada Approvals in the following Hazardous Area Locations:

- FM: Class 1, Division 2, Groups BCD
- FMc: Class 1, Division 2, Groups BCD
- ATEX: II 3(2) Ex nA nC dIIB+H2 T4



### CalorVal Applications

The CalorVal BTU Analyzer can be used in a number of different applications, for more detailed information visit [http://www.controlinstruments.com/case\\_history](http://www.controlinstruments.com/case_history):

**Heating Value:** Continuous monitoring of a chemical waste stream is necessary to identify the minimum heating value and ensure proper combustion efficiency of a flare stack. Our CalorVal BTU analyzers have the ability to accurately and continuously measure the direct BTU content of a varying waste gas stream. It is a real time measurement and will quickly respond to the alarm set point and adjust the natural gas concentration as needed. This can optimize fuel savings while meeting EPA guidelines for maximum 98% destruction efficiency of a flare stack.

**Flare Stack:** The CalorVal can be used to minimize the quantity of assist gas required for a flare stack by measuring the lower heating value of the waste gas mixtures to determine the minimum quantity of assist-gas required. Its unique design permits accurate measurement and control of multiple gas mixtures under dynamic conditions, enabling the use of adaptive assist to be applied to the flares. By knowing the LHV the flare is now able to operate economically and flexibly regardless of what chemical is burning.

**Synthetic Fibers:** The CalorVal BTU Analyzer can read high concentration levels in the %UFL range, where there is little or no oxygen present. This makes it ideal for a wide variety of filtration applications, such as engine filtration, high efficiency air and liquid filtration, battery separators, gasket materials, and specialty and industrial nonwovens. Its fast response time allows for real-time information to be processed for proper control of a process. It is fully heated

to 120°C to keep the entire sample in vapor form, which minimizes downtime.

**Biofuels:** In applications that have a process that produces a uniform synthetic gas (syngas) to power turbine engines, the CalorVal BTU analyzer is the analyzer of choice. It measures the total calorific value of the syngas which optimizes engine performance. It accurately reads the varying compositions and concentrations of all the gases in the syngas stream. Since the analyzer reads continuously, it measures in real-time mode to provide dynamic control of the engine. This accurate measurement allows for determination of the proper oxygen levels needed for complete combustion to an engine.

**Waste Fuel:** The CalorVal BTU Analyzer completely burns a sample and therefore is a direct measure of total calorific value, making it useful for determining the fuel energy of a sample. Unlike gas chromatography, which has preset look up tables, the CalorVal features "Universal Calibration" providing a highly uniform response to a wide variety of gases and solvents; regardless of what is in the sample stream.

**Waste Wood:** Installing a CalorVal BTU Analyzer on a gasification process verifies that useable fuel is made to power turbine engines. The analyzer completely burns the sample and therefore is a direct measure of Total Calorific Value. It provides an accurate and continuous measurement of the BTU content in real time mode. In addition, it's a rugged industrial design offering fast response and operating simplicity.



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## Selecting the Right Analyzer to Measure the Heating Value in Flare Stacks

It is becoming increasingly important to save energy while reducing harmful emissions when using a pollution control device such as a flare stack. In Refineries and Chemical Plants, 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 around the refineries and chemical plants, and are sent to the flare stack for destruction. US EPA code 40 CFR 60.18 states that for optimum destruction efficiency in the flare, the waste stream must run at a minimum lower heating value of between 200-300 BTU/SCF. 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.



Several different technologies are available for measuring the heating value in a flare stack including:

- Gas Chromatography
- Thermopile
- Residual Oxygen
- Micro-Combustion Calorimeter

Of these possibilities, the micro-combustion calorimeter, like the CalorVal BTU Analyzer, is the best choice. 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.

To find out more read the entire application note at <http://www.controlinstruments.com/pdf/APP030.pdf>

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## Continuous Monitoring of the Calorific Value of Mixed Gaseous Fuels

Measuring the energy of fuels formed by complex mixtures of combustible and non-combustible gases and vapors that vary in concentration or composition over time due to changing conditions, is essential. For fuel mixtures, the measurement should be fast and continuous with a universal response to any gaseous fuels over a wide measurement range. A heated sampling handling system is necessary.

In addition an analyzer should have a fast response time so it can quickly respond and activate controls for the optimization of gas-blending. Applications include flare stacks, bio-fuels, turbine engines, and feed-forward control.

To find out more read the entire white paper at:

<http://www.controlinstruments.com/pdf/ContinuousMonitoringoftheCalorificValueofMixedGaseousFuels.pdf>

