



# Improve your plant efficiency through accurate and reliable flare measurement

Flares in a refinery, liquefaction or chemical process plant are first and foremost a safety device. In many countries, it is required that the flare be monitored to assure pollution regulation standards are not exceeded. However, a flare metering device can also be used to help plants operate with greater efficiency, leading to cost savings, even in the absence of regulation.

An accurate and reliable flare measurement can identify problems before they become crises. When properly installed and maintained, an accurate flare measurement can save an operator thousands of dollars in its first months of operation, and payback any flare flow meter investment in fewer than 6 months. A properly installed flare monitor not only makes good environmental sense, it makes good business sense.

## The importance of accurate flare measurement

Consider a case of a flare that is operating with 80% methane. At flows of 200 m<sup>3</sup>/hr or only .2 ft/sec on a 42" flare, without an accurate flare measurement, the operator might think that there are no process leaks and everything is operating correctly. Over the course of a 6-month period, this would mean a loss of 692,000 cubic meters of methane, or about \$46,000 at a market price of \$1.90/MMBTU. If the flare flow meter is not installed correctly or inaccurate, unstable or simply unable to resolve low flow conditions, the plant may be wasting a considerable amount of money.

## Measuring balance of plant

Plant operators can also use the molecular weight output on a GF flare meter to help assess if a particular process is contributing excessively to a given set of flow conditions, or as an important tool for measuring plant balance. The use of molecular weight as a diagnostic tool can be invaluable for isolating process leaks quickly so that actions can be taken to correct the problem.

## Added value through computational fluid dynamics

Additionally, many flare installations from five or ten years ago have undergone changes to piping layout, flow dynamics or process conditions. These flare meters may not be accurately reporting the flow conditions due any piping changes or added flows that may be contributing to flow profile degradation. By using Computational Fluid Dynamics (CFD), a model of the fluid flow in the reconfigured piping can be performed and correction factors can be determined to produce more accurate measurements. A full service agreement that includes a flare CFD improves the overall performance of the flare meter by better understanding and accounting for the actual flow profile under the current process conditions.

## Panametrics flare measurement experience

In the early 1980s, a flare gas ultrasonic (a high frequency sound) flow meter was first jointly developed by Panametrics and Exxon (now Exxon Mobil) in Baytown, Texas, USA, demonstrating great success. Since then, ultrasonic flow meters have been gaining more and more popularity for flare gas measurement, mainly because of the high turndown ratio, relatively low installation and maintenance costs, the capability of handling unsteady flows, and the independence on gas composition. In addition, ultrasonic flow meters are not only capable of measuring flow velocities, volumetric flow and mass flow, they are also capable of producing a list of valuable diagnostic parameters, such as sound speed, signal strength and molecular weight, which are very useful for prognostics, preventative maintenance and process defect identification. Today, ultrasonic flow metering is the most accepted technology for monitoring flare gas, with more than 5,000 installations worldwide.

