# Wide operating temperature, high accuracy, flare gas metering

Integration of HotSense transducers for on-stream, wide-temperature flare gas metering of methane gas

## Key deliverables

- Integrating HotSense flare gas transducers offered frequent, consistent and high-quality methane gas velocity data across a wide temperature range ( -200 to +400 °C ) enabling our partner to **increase market penetration beyond standard upstream oil and gas, into chemical processing and refining.**
- By working integrating our HotSense ultrasonic technology, our partner customer realised **rapid path-to-market without the significant in-house product development costs and timeline, realising a product launch within 8 months.**
- HotSense is a certified intrinsically safe ultrasonic platform which **optimised system certification by matching entity parameters for safe, easy integration to existing electronics, and operation worldwide.**
- Working in tandem with our partner to provide custom transducers to their advanced flow computer technology **allowed accuracy better than ±1%, with high turn down ratio.**

## Overview

A solution was sought by a leading ultrasonic flare gas measurement provider, to expand the operating temperature range, sensitivity and penetration of their ultrasonic transducers, to provide highly accurate and reliable flare gas flow rates in a range of challenging applications.

Flare gas emissions have significant environmental impacts, as they include volatile organic compounds ( VOCs ) and nitrogen oxides ( NOx ) which contribute to the formation of smog, acid rain and have harmful effects on health, as well as methane ( $CH_4$ ) and carbon dioxide ( $CO_2$ ) – equivalent to 400 million tons of $CO_2$ emissions in 2019 – contributing to greenhouse gas emissions and climate change. Measuring flare gas emissions is a critical step in identifying

+44 (0) 1484 505 859
contact@ionix.at
ionixadvancedtechnologies.co.uk

opportunities to reduce these emissions, and is becoming increasingly under legislative control and taxation throughout the US

( Environmental Protection Agency ) and the European Union, which now limit the volumes of gas that can be flared. Ultrasonic flare gas meters are effective at measuring the gas velocity and calculating volumetric flow rate with high accuracy and reliability. As the range of flare gases and applications increase, a requirement for expanding the operating temperature from -200 through to +400 °C was required, whilst maintaining accurate measurements in challenging gas compositions, and being capable of operating in potentially explosive atmospheres.

## The Challenge

Typically, methane and carbon dioxide gases are viewed as challenging gases to transmit ultrasound, which comprises a significant proportion of modern flare gas mixtures. Coupled with the wide operating temperature range to meet the varied applications and gas compositions, there were a number of challenges which required a reliable platform solution.

- A wide continuous operating temperature was required which could operate from -200 to +400 °C.
- High sensitivity, and tight frequency control is required to penetrate challenging gases
- Flare gases are often explosive mixtures, which require intrinsically safe design and certified equipment.

## The Solution

Ionix worked in partnership with our client to customise our existing HotSense extreme environment ultrasonic platform to produce flare gas transducers which;

- By integrating our HPZ high-performance piezo-ceramic technology, we achieved the highest sensitivity and accuracy of any flare gas meter in the market, through a range of challenging gases including methane and carbon dioxide.
- Operate continuously across the wide temperature range with no loss of fidelity.
- Certified intrinsically safe for operation in the harshest Zone 0 hazardous locations.
- Fully NACE compliance for materials of construction.
- High repeatability and robustness, to ensure long service life and reduced maintenance.

## Execution

By working closely with our partner, we reduced the in-house development costs of starting from scratch, by customising our award winning HotSense platform, powered by our unique HPZ high-performance piezo-technology, and delivered a product within 8 months of initial design.