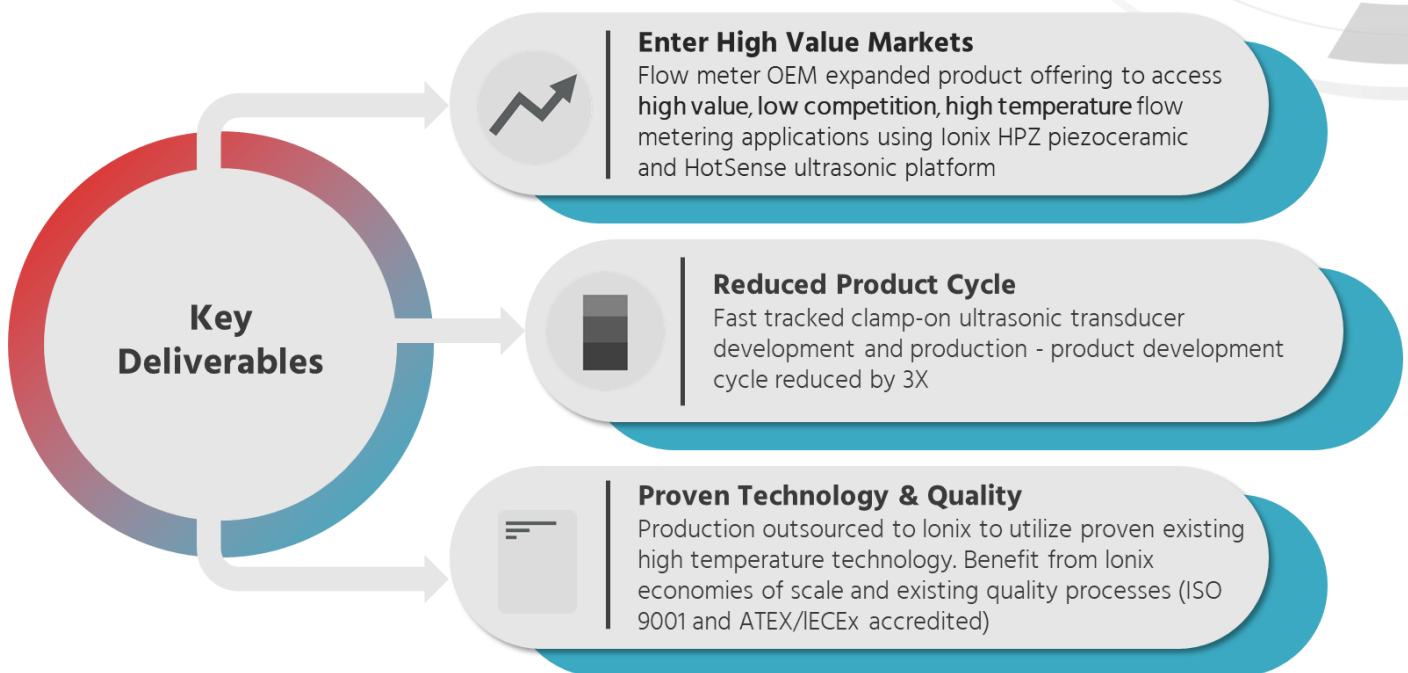


Accelerating High Temperature Clamp-On Flow Transducer Development with Ionix HPZ

For flow measurement of high temperature fluids such as oils, molten metal, salts and hydrocarbons



Overview

In response to direct customer requests and a detailed market analysis, a flow meter OEM was looking to expand its product catalogue with a high temperature, intrinsically safe clamp-on flow meter.

The sales and marketing team identified increasing demand for a solution to operate at temperatures over 150°C and up to 550°C for applications such as:

- Molten salt flow monitoring in the nuclear (SMR) and solar concentrator industries
- Hydrocarbon flow metering in response to changing fuel demands and drive for refining industry efficiency gains
- Oil fluid flow for cooking and heat transfer applications from plants looking to minimise downtime and reduce running costs

Our flow OEM partner had limited prior high temperature experience and no new high-temperature skilled hires in the roadmap. To achieve a high temperature product, they needed to outsource the development and manufacturing to an industry expert.

The Challenge

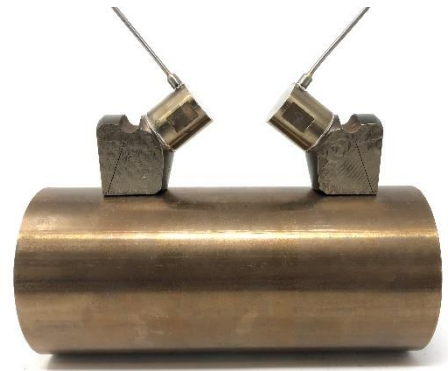
A demand and business opportunity had been identified by the Sales and Marketing team but the R&D, Products and Manufacturing Teams did not have a solution which met the required budget and timescales.

Previous exploration of high temperature applications had identified missing material, sensor and manufacturing gaps in the company's capabilities and IP, including the requirement for:

1. A high temperature piezoceramic material with high sensitivity, critical for flow measurements.
2. A method of producing shear waves at high temperatures.
3. A robust sensor solution which was proven to operate at high temperatures, in hazardous and explosive environments and which would be compatible with existing electronics.

The Solution

- The OEM utilised Ionix sensor design and manufacturing services to accelerate product development and launch.
- A high temperature flow transducer was developed using Ionix HotSense ultrasonic framework, previously proven with over 10 years of thickness monitoring in extreme environments.
- Product development cycle reduced by 3X without the risk of the OEM taking on more specialist team members.



Execution

At the core of the sensor was the Ionix HPZ 580 piezo ceramic material

- Operation up to 580°C continuously
- Sensitivity order of magnitude larger than other high temperature materials

The HotSense ultrasonic platforms provide proven high temperature solutions for:

- Electrical interconnects
- Internal coupling of the piezo to wedge
- Coupling of the transducer to a test piece
- Cables
- Housing
- Ex certified

HotSense was modified to produce the required ultrasonic modes for flow measurement, shear waves, and the measurements were validated on test loops with the OEMs existing electronics.

The existing Ionix HotSense manufacturing processes and suppliers were used to quickly scale-up production whilst achieving cost and quality targets.