



SAW Symposium 2020 KEYNOTE talk

SAW Temperature Measurement in Laboratory Applications

Daryl Williams¹, Frieder Birkholz², Hannes Funke², Rob Price¹, *

Surface Measurement Systems Limited¹, HA0 4PE London, UK

SAW COMPONENTS Dresden GmbH², 01099 Dresden, Germany

*Corresponding Author: daryl@smsuk.co.uk

Background, Motivation and Objective

There are many scientific and engineering laboratory applications where critical temperatures for process, test or research investigations are required, but are difficult to determine experimentally. Despite the popularity of thermocouples and PT100/1000 sensors, many applications which involve high pressures, vacuum, moving or rotating machinery, sensitive instrumentation as well as difficult to access location such as inside reactors or process equipment or even *in vitro* biological environments, are not easily serviced by such hard wired sensors. So despite the potential attractiveness for utilising SAW sensors in these applications, few commercial laboratory deployments of SAW temperature sensors are known.

Statement of the Contribution/Methods

This study will demonstrate the feasibility of using miniature (2.5mm diameter) SAW temperature sensors operating at ISM 2.4 GHz-Band for a range difficult to access laboratory applications. Data will be presented which shows the utility and limitations of these devices.

Results/Discussion

A series of demonstration applications will be presented which show the utility of SAW devices for:

- Measuring temperature within a chemical reactor systems
- Determining temperatures within vacuum processing equipment
- Evaluating true temperatures within laboratory furnaces

SAW signal quality and integrity, temperature resolution, device performance, operation constraints as well as overall comparison with traditional temperature measurement approaches will be reported.