

# Dr.Kaden SensorEngineering

## Who we are

Dr.Kaden, the founder is familiar with piezoresistive sensor technology since his studies in the 70th. He got experiences at first in biomedical and also industrial applications. There was also a longer time in Dresden Technical University as an scientist. Former students supported in this time are in sensor companies around the world today. During the 90<sup>th</sup> until 2003 he was with Keller AG and Kistler AG in Switzerland. He was responsible for quality assurance, manufacturing and special development projects. He's one of the specialists on piezoresistive sensors today.

Typical harsh environment applications where we are actually active in are:

### **-flight critical aircraft applications**

(mainly we drive the project management and qualification on order of Keller AG Winterthur, who is finally the manufacturer and supplier of such sensor solutions)  
sensors for aircraft cabin pressure control system

-flying successful since more than 7 years with 0 rejections in

-A320, A340

-Embraer

-and in A380 also now

-actual we are responsible for the project management for sensor

development for cabin pressure control system and hydraulic sensors for

-A400

-B787

### **-applications in oil and gas instrumentation**

sensors for down hole, subsea, wellhead,

sensors for several special applications like

-streamer for seawater applications

hermetically sealed packaging solutions for customer electronics

We've seen in most cases in oil and gas applications as well as in aircraft applications it's not enough to sell the product itself. The customers mostly need also support regarding

- the right choice of the sensor

- the proper handling and mounting to get the best accuracy  
and/or best reliability

- the realistic achievable data

This support in most cases isn't given by typical sensor suppliers since they have a wide scope of applications and don't have the detailed knowledge to fit such special applications. That's why our Sensor Engineering company was founded in the beginning of 2003.

### **Sensor Engineering**

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# Dr.Kaden SensorEngineering

Today this company has engineering and consultancy contracts with several customers in

- Alberta
- Scotland
- Texas

There are also still good relationships with the main suppliers of suited piezoresistive sensor cells for such applications, the Swiss companies Keller and Kistler to support special projects in aerospace and oil and gas applications again.

Both companies allowed us also to buy, and sell their products. This includes the possibility to modify their products in their location on need of customers.

Since Switzerland isn't a member of the European Community to do so it was necessary also to found a company in Switzerland to handle the sensor business itself.

(By the way, there are only 2km between SensorEngineering and Sensotreme GmbH)

## **Sensotreme GmbH**

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Beside the existing customer relations we are in contact with a lot of the important suppliers of instrumentation for oil and gas preparing future common projects in the areas of

- Calgary/Edmonton
- Houston
- Aberdeen
- Bergen/Stavanger

Piezoresistive sensors exist today in 2 technologies:

- standard with pn junctions for temperature ranges up to 150 (170)°C and pressure up to 1000 (1350)bar; accuracy  $\leq 0,1\%$ FS
- SOI for temperature ranges up to 200(220) °C and pressure ranges up to 2000bar (and more); accuracy  $\leq 0,3\%$ FS

In every case beside the possibility to measure pressure you can ever measure also temperature. Highlights for future solutions we are developing will be:

- piezoresistive sensors for temperatures up to 220°C
- differential pressure sensors for ranges  $< 10$ bar at line pressures up to 1000bar

## **To summarise :**

We like to offer to our customers:

- sensors combined with detailed knowledge regarding sensor properties in harsh environment
- experiences in a lot of real sensor applications in oil and gas exploration and exploitation
- the ability to modify existing sensor solutions to the requirements of customers
- our packing experiences also for other sensor principles (for instance gyro's)

Our knowledge is specialised on piezoresistive technology, which gives compared with quartz solutions

- much lower prices
- at only slightly higher tolerances with the advantage to measure temperature also