



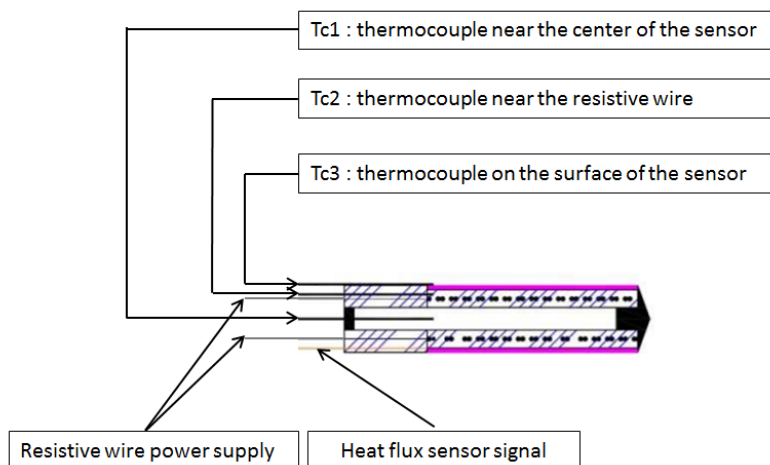
## Cylindrical Heat Flux Sensor

### Technology

The developed device is composed of a cylindrical active sensor allowing a thermal solicitation of the studied material.

This heat flux device is based on the thermo-electrical principles in order to control and measure the thermal flux provided to the material.

Thermocouples are disposed all along the device which allows a temperature measurement in different areas.



### Benefits

- This device take into consideration the contact resistance in order to improve the precision compared to traditional hot wire measurement
- A single measurement allows to get different thermal characteristics such as thermal conductivity, thermal diffusivity and thermal effusivity
- The range of thermal conductivity is large; from 0,25 to 200 W/m.K
- Sensitivity ( $\mu\text{V}/\text{W}/\text{m}^2$ ) is better than flat heat flux sensor
- High versatility of the device which allows an active or passive measurement with or without thermal excitation
- Capability to measure continuously in order to monitor the thermal characteristics in a changing material (.e.g quantity of water in a granular material)
- Capability to measure thermal characteristic of different types of materials like liquid, solid (granular, porous...)

### Applications

- Thermal quality control
  - Food cooking, Pasta....
- In situ thermal measurements of materials (porous...)
  - Powder (food processing industry, pharmaceuticals, geology....)
  - Raw construction material



### Keywords

- Cylindrical sensor
- Thermal Characteristics
- In situ measurement



### Intellectual Property

French Patent Pending  
Reference : FR 16 51535  
Owner : Université d'Artois



### Development Status

A prototype has been developed in the laboratory in order to validate the system.



### Partnership

Licensing and/or partnership

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