Hukseflux SRC02 Thermal Sensors Owner's Manual

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Hukseflux Thermal Sensors

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Engineering services

- Challenging heat transfer or thermal measurement problem? Contact Hukseflux
- Hukseflux offers measurement solutions for the most challenging applications.
- Our expertise in determining heat transfer and thermal quantities is at your disposal via our engineering services. Let us help you to improve product concepts and get better results.

Introduction

- Hukseflux's main area of expertise is the measurement of heat transfer and thermal quantities. We are known as a leading manufacturer of heat flux sensors, pyranometers and a range of thermal measuring systems. Did you know that Hukseflux offers engineering services as well?
- We apply our expertise to related fields such as the measurement of temperature differences, thermal contact resistance to flow sensors, fouling sensors and many more.
- Highlighted in this brochure are some examples of the challenging applications we encountered and the solutions we provided to our customers.

Services: what we do

- design customer-specific experiments, for example, to characterise materials or determine thermal properties such as thermal contact resistances
- design and supply complete measuring and control systems, for example for use in the customer's production or quality assurance processes
- design customer-specific sensors, sometimes, not always, later manufactured by ourselves for the same customer

Why work with us
Having Hukseflux experts on board, you will get better results faster.

- our people, many with degrees in engineering and physics, have many years of accumulated experience performing measurements, designing experiments and building practical equipment. This helps, for example, to save time, make equipment serviceable, more accurate or at a lower cost
- in many cases we “recycle” our existing thermal measurement and control expertise in our customer’s application
- we have many custom-made sensors (for heat flux and differential temperature) as well as measuring systems that make it possible to quickly and efficiently perform our first prototyping

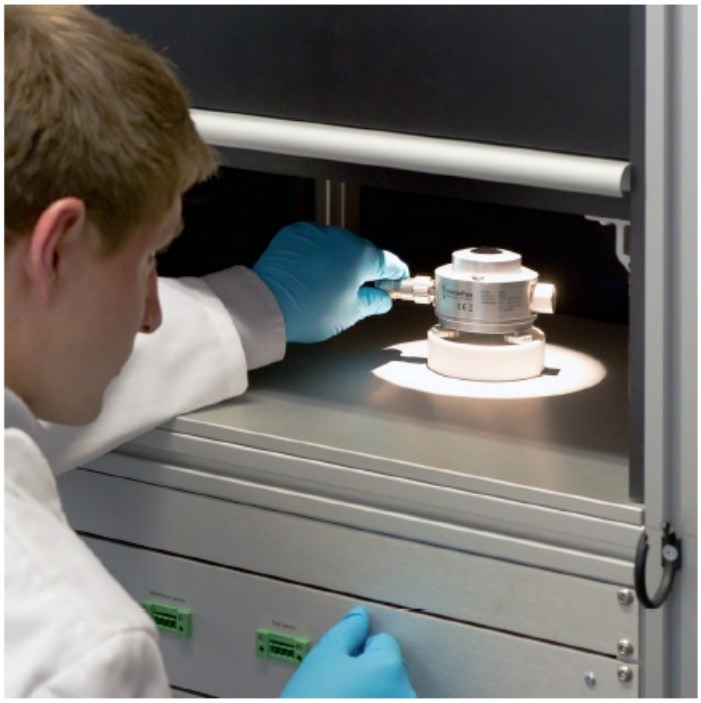

Figure 1 *User at work with a typical measuring system supplied by Hukseflux.*

The next pages show you some example projects carried out by Hukseflux via its engineering services and some references. Please contact us to discuss if our engineering services can offer a solution for your needs.

Example projects

Figure 2 *Example of a typical test facility designed by Hukseflux: SRC02. 19-inch rack, height 2.4 m. (see also figure 3).*

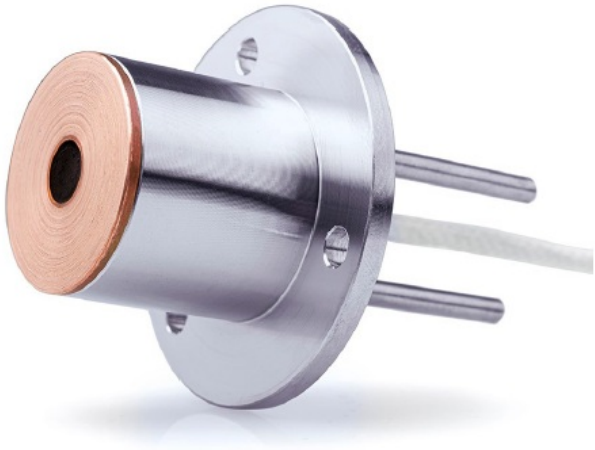

Figure 3 *Water-cooled Gardon Gauge developed in cooperation with Sandia National Laboratories.*

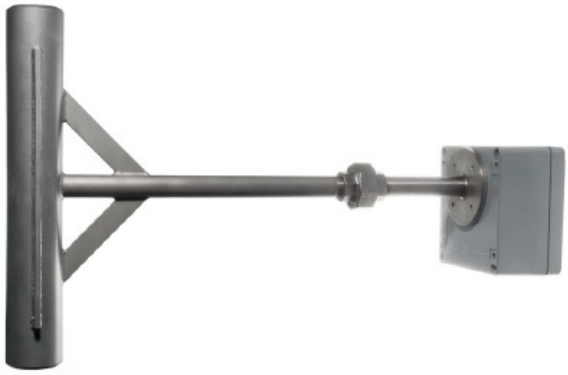

Figure 4 *Example of a typical sensor designed by Hukseflux engineering services for one single user; Clyde Bergeman Power Group. CBW01 heat flux sensor on a steam pipe. The sensor is located in the weld material at the crown of the tube. Typical use is in coal-fired boilers and solar concentrators. Wiring is led away in the vertical tube to a connection box through the boiler insulation material. CBW01 is ASME certified.*

Figure 5 *Example of a typical OEM sensor designed by Hukseflux: pyranometer for inclusion in the integrated MaxiMet compact weather station of Gill Instruments.*

Project Overview

Table 1 Hukseflux thermal engineering and consultancy, list of some of the projects we carried out.

HUKSEFLUX THERMAL ENGINEERING AND CONSULTANCY		
FIELD OF APPLICATION	**PURPOSE**	**SOLUTION**

Production of plastics with nanop articles	Measurement of the thermal prop erties of plastic melts with nanoparticles, consistency monitoring	Thermal conductivity sensor working at high pressures and temperatures in an extrusion environment. Funded by E.U. , FP7 NanoOnSpect project
Meteorological calibration laboratory	Calibration of solar radiation sens ors	SRC02 solar radiation calibration facilit y (see figure 2)
Semiconductor manufacturing	Measurement of contact resistance of interface layers in th e 10 to 50 x 10^{-6} m thickness ran ge, design verification	Specially developed measurement prin ciple for thermal resistance eliminating the effect of contact resistance
Oil and gas; LNG pipeline insulati on	Measurement of tube thermal ins ulation for Liquefied Natural Gas (LNG) transport, design verificatio n	Thermal resistance test rig at partner in stitute, TNO, working at -160 °C
Composite testing	Estimating the through-fibre and along-fibre thermal conductivity of aramid fibres	Preparation of dedicated specimens, a nd test method, using fibres cast into epox y
Graphene	Measurement of aging of graphene in space applications, stability ver ification	Test facility for comparative thermal res istance testing of sheet material
LED’s	Measurement of the thermal pow er generated by LED engines, approval testing	LED thermal power tester with integrat ed absolute calibration. Sponsored by the ZHAGA consortium
Building physics	Testing thermal properties of building components in a real ope rating environment	Equipping a container-size PASLINK te st cell with specially designed heat flux sensors (cells are also known as PASS YS cells).
Coal-fired boilers	Measurement of fouling and contr ol of soot blowers for Clyde Bergemann Power Group	Heat flux sensor mounted in the weld material of a boiler pipe
Solar concentrators	Measurement of high heat fluxes up to 2500 x 10^3 W/m^2	Water-cooled Gardon gauge. Project in collaboration with Sandia National Laboratories

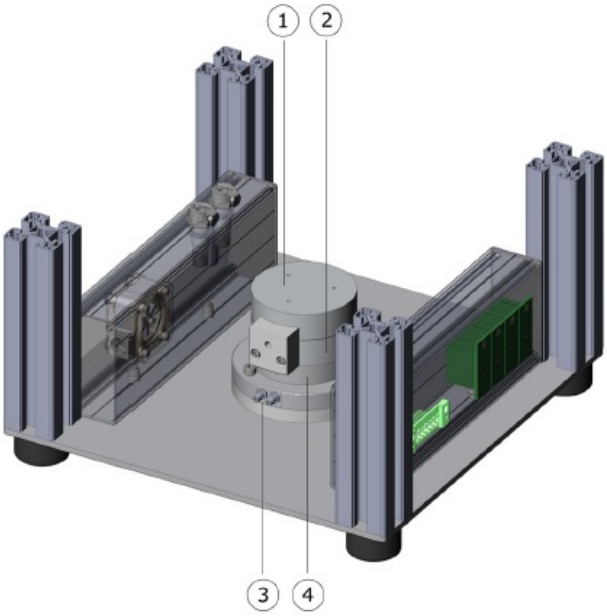

Figure 6 *Cross-section of a test facility designed by Hukseflux engineering services. LED thermal power tested designed for the ZHAGA consortium. The LED engine is mounted on the LED attachment block (1). Generated heat passes through a heat flux sensor (2) to the cooling water inlet and outlet (3). An internal heater (4) is used to calibrate the system.*

Figure 7 *Example of a measuring system designed by Hukseflux engineering. Measuring system for analysis of the thermal resistance and the thermal transmittance of building elements by in-situ measurement. TRSYS02 is used for measurements according to ISO 9869 and ASTM C1155 / C1046 standards.*

Figure 8 *TRSYS02 in use: on-site measurement of the building envelope thermal resistance.*

References

About Hukseflux

Hukseflux Thermal Sensors offers measurement solutions for the most challenging applications. We design and supply sensors as well as test and measuring systems, and offer related services such as engineering. Our main area of expertise is measurement of heat transfer and thermal quantities such as solar radiation and heat flux. Hukseflux is ISO 9001 and ISO 14001 certified. Hukseflux sensors, systems and services are offered worldwide via our headquarters in the Netherlands, and locally owned representative sales offices in the USA, Brazil, India, China, Southeast Asia and Japan.

Contact Hukseflux
We offer creative solutions as well as the highest quality products at an acceptable price level. If we cannot offer you an acceptable solution ourselves, we will tell you who can. Please contact us to discuss if our engineering services can offer a solution for your needs.

Challenging heat transfer or thermal measurement problem? E-mail us at: **info@hukseflux.com**.

CONTACT

- Copyright by Hukseflux. Version 2403. We reserve the right to change specifications without prior noticeFor Hukseflux Thermal Sensors go to **www.hukseflux.com** or e-mail us: **info@hukseflux.com**.

Documents / Resources

	**Hukseflux SRC02 Thermal Sensors** [pdf] Owner's Manual CBW01, SRC02 Thermal Sensors, SRC02, Thermal Sensors, Sensors

References

- **User Manual**