

Heat flux sensors for boiler monitoring

Sensors to improve insight in the heat transfer process; fouling and corrosion behaviour

Measurement of heat flux in boilers is an accepted tool for process analysis. Relative to conventional monitoring based on temperature, use of heat flux sensors improves insight in processes such as fouling and corrosion and contributes to better process control. It is used in particular when changing burners, fuel type or other process conditions. Our experience includes a variety of environments such as coal- and biomass fired boilers and waste incinerators. Used together with cleaning systems / soot blowers, heat flux sensors contribute to higher boiler efficiency and lower boiler emissions.

Introduction

Hukseflux Thermal Sensors offers a range of **heat flux sensors** for use in industrial environments. Our sensors for industrial use are often designed in close cooperation with customers. At Hukseflux, we like having a good technical conversation. Please **contact** us to discuss your specific application.

Why add heat flux?

Many industrial systems rely on temperature measurements. Heat flux measurements offer additional information; a direct measurement of

- local heat transfer;
- tube surface temperature.

Measuring both quantities offer a better picture of what is happening in your boiler.

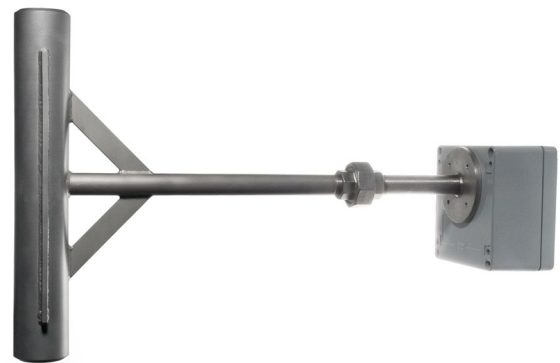


Figure 2 CBW01 model heat flux sensor on a steam pipe. The sensor is located in the weld material at the crown of the tube. Typical use is in coal fired boilers and solar concentrators. Wiring is led away in the vertical tube to a connection box through the boiler insulation material. Is installed in the boiler steam circuit, CBW may be supplied with ASME certification.

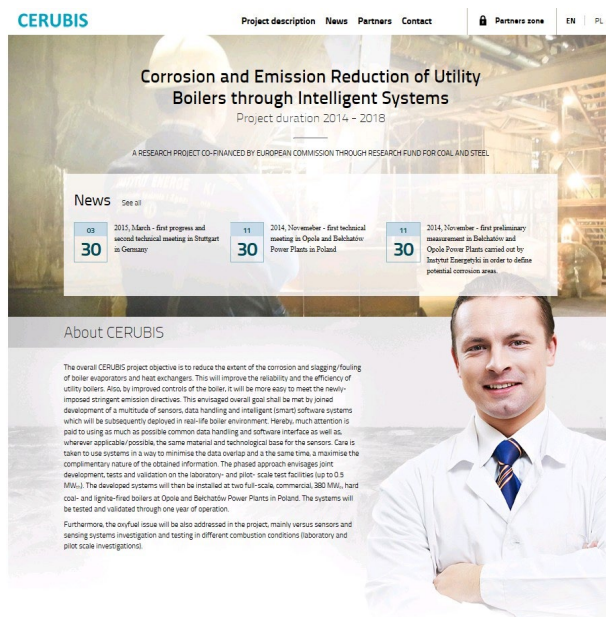


Figure 1 Scientific support for the heat flux measurement in boilers; the *Cerubis* project has been running from 2014 to 2018 and aimed at corrosion reduction.

Installed base

Hukseflux is the global market leader in heat flux measurements, also for boilers. Around 400, mostly utility-scale, boilers are equipped with sensors designed by Hukseflux.

Typical installation

A typical boiler employs 24 sensors; 4 walls at 4 levels. In some cases, this number is reduced to 16 or 8.

Table 1 Use of heat flux sensors in boilers.

Purpose	Approach
Boiler fouling monitoring	trend monitoring of the heat flux signal at a constant boiler load is a widely accepted method of fouling and slagging analysis
Heat transfer monitoring	a heat flux sensor offers a direct and “robust” measurement of the local heat transfer from fire to steam
Flame position estimation	heat transfer measurement at different locations, for example on 4 sides of a boiler at multiple levels, offer a good clue to the flame position
Corrosion monitoring	a heat flux sensor is one of the key elements in analysis of corrosion monitoring
Sootblower control	Clyde Bergemann Power Group (CBPG) offers intelligent sootblower control, employing heat flux sensors. For this application CBPG cooperates with Hukseflux



Figure 3 CBW01 heat flux sensor for fouling measurement has been installed in hundreds of power plants all over the world, contributing to higher boiler efficiency and lower emissions.

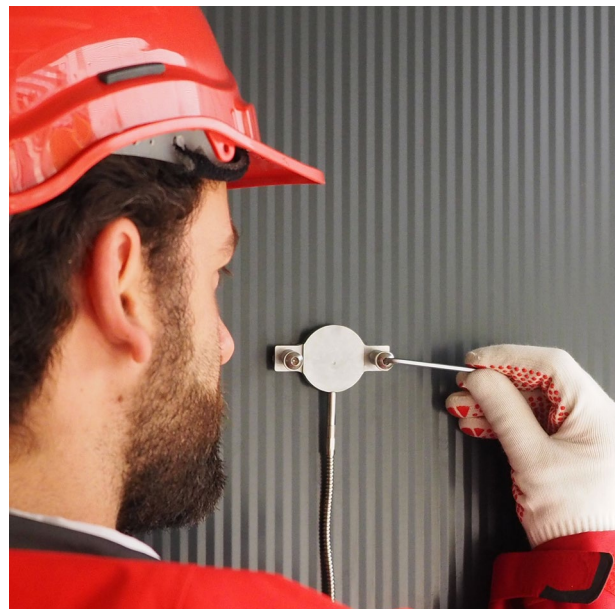


Figure 4 IHF01 model sensor screwed on a low heat flux exchanger wall. A version for boiler tubes is welded on the tube.

Some of our references



Sensor model

We supply 2 sensor models:

- CBW type: highest accuracy, most representative fouling behaviour, sensor part of steam pipe. Installation: take out part of existing steam pipe.
- IHF model: lower accuracy, less representative fouling behaviour, lower cost than CBW01. Installation: welded on top of steam pipe

Standards

Products are manufactured under ISO 9001 quality management system. If applicable, the sensors comply with industrial standards such as ITS90, ANSI, DIN, and BS. Sensors for hazardous areas can be manufactured according to safety standards like EExi, ATEX / Cenelec and NAMUR.

About Hukseflux

Hukseflux is the leading expert in measurement of energy transfer. We design and manufacture sensors and measuring systems that support the energy transition. We are market leaders in solar radiation- and heat flux measurement.

Customers are served through the main office in the Netherlands, and locally owned representations in the USA, Brazil, India, China, Southeast Asia and Japan.

Interested in this product?
E-mail us at: info@hukseflux.com