

# Selecting a heat flux sensor; what not to do

Selecting a heat flux sensor for your application is not easy. This document highlights what not to do.

## Too small for many applications

Average out: use multiple sensors, do not use sensors that are too small.

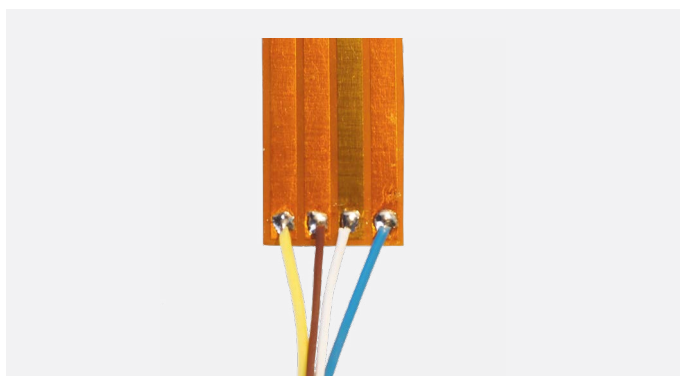
Heat fluxes tend to be spatially variable. One spot is often not representative of the whole area that must be analyzed. Use multiple sensors and compare. Use sensors larger than 10 x 10 mm.



## Vulnerable wiring, no strain relief

Choose the right strain relief: avoid out-of-spec connection of signal wires.

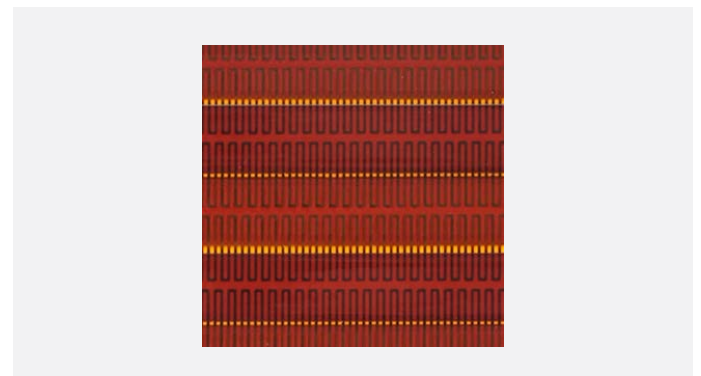
The thin copper traces of flex circuits and PCBs are vulnerable. Even when provided with solder pads these are not rated for any serious dynamic strain. If there is any risk of strain on the wiring, ensure that your sensor-to-signal-wire connection is sturdy and provides strain relief for the sensor. Invest in good wiring.



## If you see the thermopile pattern, this is a bad sensor: high thermal conductivity dependence

Watch out for micro effects: use sensors with thermal spreaders.

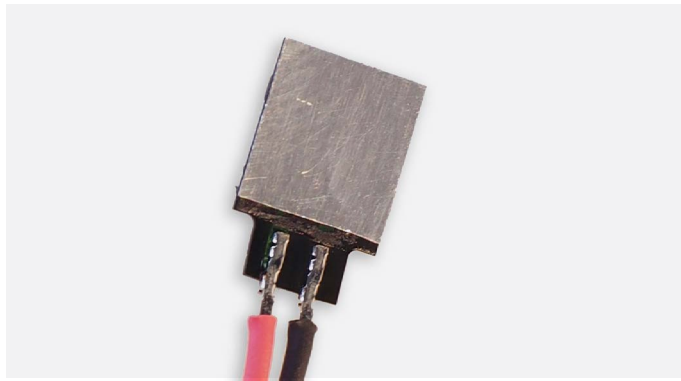
A thermal spreader, i.e. a conductive layer covering the sensor, helps reduce the thermal conductivity dependence of the measurement. Be careful when using sensors without thermal spreaders. Read our note on [why use spreaders](#).



## No thermal guard

Watch out for edge effects: do not use a thermal spreader extending across the entire sensor.

Although the use of thermal spreaders often is a good idea, for general heat flux measurement it is better to have a passive guard area. Guards reduce sensitivity to edge effects, and can also be used for sensor mounting without disturbing the sensitive area.



## Signal wires in contact with housing

Invest in signal quality and electrical safety: signal wires must be electrically insulated from the sensor housing .

Signal wires should be electrically insulated. This guarantees electrical immunity. Sensors having wire connections with open contact to the environment are high-risk in terms of measurement error (zero offsets caused by ground loops) as well as potential safety issue. In industrial environments this often is not allowed.

## Unstable, air-filled cavities in the sensor and unprotected corrosive spreaders

Watch out for corrosion; choose the right IP environmental protection class.

Many sensors have:

- wire connections with open contact to the environment
- unprotected (copper) thermal spreaders and also
- some designs use air cavities inside the sensor. They may fill up with water, and promote internal corrosion. Read our review on [sensor technology](#).

In case these come in contact with moisture, this is a large potential source of damage , as well as a starting point for corrosion and sensor instability.



## About Hukx

Hukx is the leading innovator in solar radiation and heat flux sensor technology. We are proud to set the standard in high-accuracy measurement, and to be working at the heart of the energy transition.

Customers worldwide rely on our bestselling pyranometers and heat flux sensors. From sensor design and selection to supply and recalibration, we support you across the entire lifecycle.

Hukx is headquartered in the Netherlands, with locally owned representative sales offices in the USA, Brazil, India, China, Southeast Asia, and Japan.

Let us help you select the best sensor for your application. Get in touch with our experts today via: [info@hukx.com](mailto:info@hukx.com)

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