



Laboratory Thermopile

For the measurement of radiant fluxes in laboratory environments

There are many situations in laboratory environments, both in education and research where it is necessary to measure radiant fluxes with high accuracy. Typically this is an optical laboratory or a physics department where the equipment is mounted onto optical benches or tables.

For this application a thermopile is the ideal type of detector because of its wide spectral response and good linearity. Because the laboratory environment is stable and clean, it does not need temperature correction or weather protection and can be used without a window for the widest measurement range.

The radiometer should have a restricted field of view so that it only sees the radiation required to be measured and not the other sources of radiation in the environment around it. The thermopile detector generates a small voltage proportional to the radiation received.

The Kipp & Zonen model CA2 radiometer is widely used in optical and physics laboratories around the world and is supplied with a mounting rod suitable for use with standard optical bench fixing clamps. The signal voltage is usually displayed using a high accuracy digital voltmeter and can be converted into irradiance values in W/m^2 , using the sensitivity supplied on the calibration certificate.

CA2



CA2 is based on the same type of thermopile detector as our CMP3 and CMP6 pyranometers. Because it has a limited field of view it can be used to measure the intensity of radiant fluxes coming from a specific location or a specific source.

CA2 is sensitive to radiation from 0.2 to 50 μm , and has a field of view of 20° for 90% of the received radiation. This is determined by cylindrical brass housing that contains a conical reflector. The removable glass window reduces convection effects and radiation losses but restricts the spectral range to 0.3 to 3 μm .

The thermopile is ideal for control purposes (such as ovens), demonstration purposes in schools and technical institutes or to be used for reference measurements in optical laboratories. The mounting rod allows easy fixing to standard optical bench fixing clamps. The terminals allow simple connection of bare wires or 4 mm banana plugs.

Specifications	
Spectral range (without window)	0.2 to 50 μm
(with window)	0.35 to 2.8 μm
Sensitivity (Parallel beam on front window)	7 to 20 $\mu\text{V}/\text{W}/\text{m}^2$
Impedance	20 to 200 Ω
Expected output range (0 to 1500 W/m^2)	0 to 30 mV
Maximum operational irradiance	2000 W/m^2
Response time (63%)	< 6 s
Response time (95%)	< 18 s
Non-linearity (100 to 1000 W/m^2)	< 1.5 %
Field of view	20° (for 90% of the received radiation)
Mounting rod	170 mm long x 10 mm \varnothing
Detector type	Thermopile
Operational temperature range	-40°C to +80°C
Storage temperature range	-40°C to +80°C
Humidity range	0 to 100% non-condensing
Ingress Protection (IP) rating	For use in clean indoor conditions only

Part number	Instrument
1311907	CA2 Laboratory Thermopile

Part number	Options (configured/adjusted to suit instrument)
0365911	METEON irradiance meter and data logger • configured
0365901	AMPBOX signal amplifier • gain adjusted