

UV RADIOMETER RANGE

Spectral responses optimised for UV-A, UV-B and UV-E

Very good cosine response: < 2.5 % error at 70 ° zenith angle

Excellent long-term stability

Internal thermostating at 25 °C

Cost-effective dual-band models



ACCURATE MEASUREMENTS OF SOLAR ULTRAVIOLET RADIATION

Kipp & Zonen UVS Radiometers represent the state of the art in atmospheric UV instrument design providing a maximum of precision, reliability and long-term stability.

Outstanding features of UVS Radiometers are:

- Replaceable precision Quartz dome
- Specially shaped diffuser for very good cosine response
- Diffuser reduces long-term drift and thermal modulation by protecting the black glass filter from direct solar exposure
- All radiometers are temperature controlled at 25 °C, including filters, detector module and pre-amplifier
- Built-in levelling
- Screw-in drying cartridge minimises internal humidity
- Plug and socket cable connection

UVS Radiometers form a set of instruments for accurate measurements of solar ultraviolet radiation through the atmosphere. Three spectral responses are available which match various measurement needs and include dual-band models.

TYPE	FOR THE MEASUREMENT OF
UVS A	UV-A irradiance
UVS B	UV-B irradiance
UVS E	Erythemally active UV irradiance
UVS AB	UV-A + UV-B irradiance
UVS AE	UV-A + Erythemally active UV irradiance

UVS^A MEASURES ATMOSPHERIC UV-A

The UVS-A has a broad spectral response optimised for precise measurements of atmospheric UV-A irradiance.

UVS^B MEASURES ATMOSPHERIC UV-B

Compared to the spectral response of the UVS-E, the UVS-B has a sharper cut-off at the transition from UV-B to UV-A. This feature reduces the UV-A contribution to the radiometer output and permits the highest possible correlation to atmospheric UV-B irradiance.

The UVS Radiometers have sealed, weather resistant cases made from protected aluminium. They permit continuous outdoor operation. The Radiometers can easily be adjusted in the horizontal by help of leveling feet and the built-in bubble level. A single DC supply voltage is needed for operation of the temperature control and the signal amplifier.

All Radiometers have an analog voltage output which is proportional to the measured UV irradiance. Dual-band models have two independent signal outputs.

All models have an output for monitoring internal temperature.



UVS^E SIMULATES THE HUMAN SKIN

The UVS-E has a spectral response that is adapted to the erythema (sunburn) action spectrum of the human skin (ISO 17166:1999 / CIE S 007/E-1998). Hence, this radiometer collects information of medical and public concern; UV Index, Erythema dose and dose rate.

Due to the Robertson-Berger type spectral response of the UVS-E radiometers, measurements can be related to existing monitoring network data.

UVS^{AB} UVS^{AE} DUAL BAND

These models are very cost-effective by combining two independent measurements in a single instrument

APPLICATIONS

Meteorology

Biology

Medicine

Materials testing

Public information services

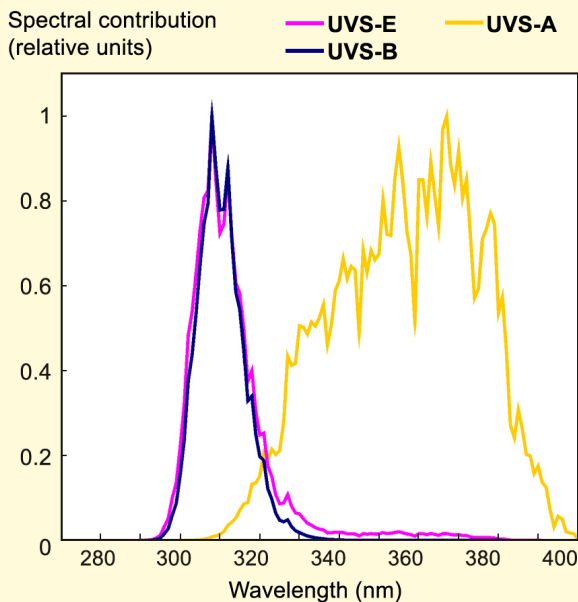


SPECTRAL RESPONSES OF THE UV SENSORS

The 3 spectral responses are carefully adapted to the respective measurement application. They are generated by sequences of colored glass layers and fluorescent phosphors, followed by a matching semiconductor photon detector. The Graphs on this page show the spectral responses in different representations.

Precision manufacturing according to ISO 9001:2000 and individual spectroradiometric calibrations ensure a high degree of reproducibility and comparability from unit to unit. The calibrations are linked to other calibration references through Kipp & Zonen's international cooperation in projects to establish world-wide UV radiation standards.

SOLAR SPECTRAL CONTRIBUTION

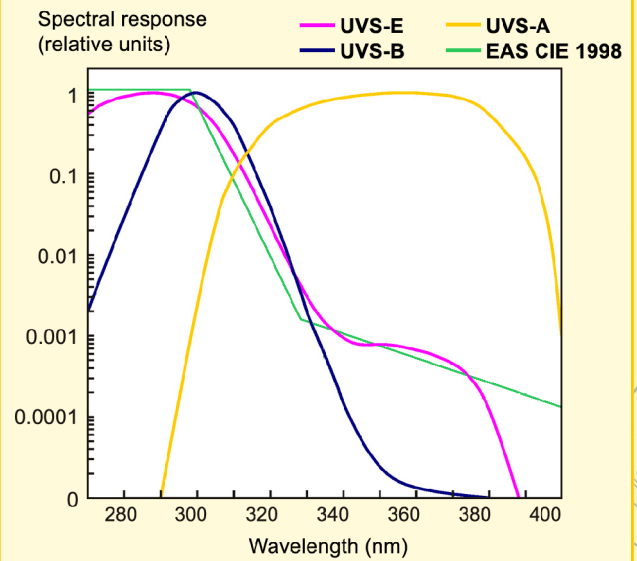


Spectral contributions equivalent to the UV Sensor outputs. The curves are obtained by convolution of the UV Sensor responses with the reference solar calibration spectrum (0° zenith angle, 0.32 cm ozone column).

CALIBRATION The spectral distribution of atmospheric UV irradiance is very variable, mainly depending on sun elevation and stratospheric ozone. During the calibration of the UVS Radiometers this variability is taken into account by systematic convolution of the spectral response function with observed and modelled atmospheric UV spectra.

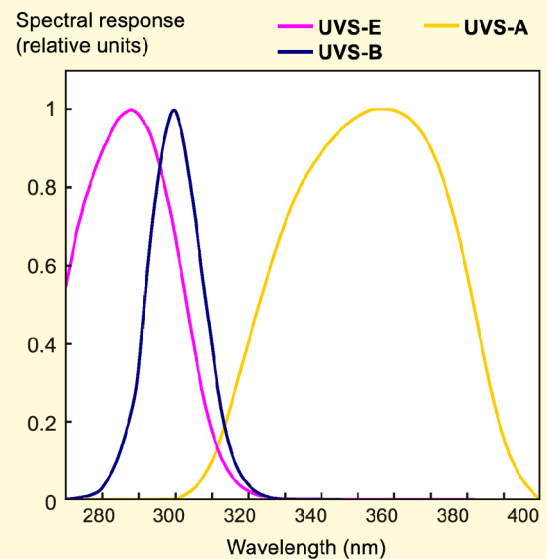
For the calibration of the reference UVS

LOGARITHMIC SPECTRAL RESPONSE



All the UVS spectral responses compared to erythemal action spectrum on a logarithmic scale.

LINEAR SPECTRAL RESPONSE



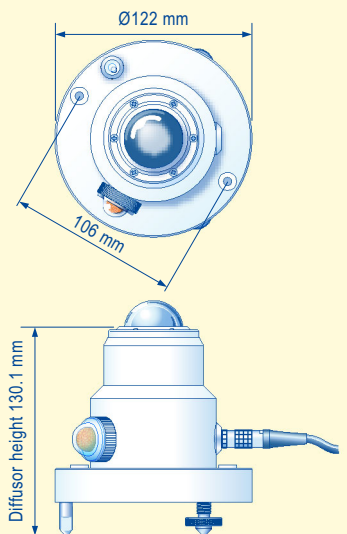
Radiometers the sun is the UV radiation source and a Brewer MKIII Spectrophotometer is used to measure the spectral irradiance. The calibration measurement reports are enclosed with every UV-S Radiometer. Due to this extended calibration method the highest possible measurement accuracy is achieved by applying corrections for the air mass and ozone column at the time and location of the measurement.

TECHNICAL SPECIFICATIONS

	UVS-E-T	UVS-B-T SINGLE BAND	UVS-A-T	UVS-AB/AE-T DUAL BAND
Spectral response (see graphs on page 3)	UV-E ISO 17166:1999 / CIE S 007/E-1998	UV-B Nominal 280 – 315 nm	UV-A Nominal 315 – 400 nm	UV-A + UV-B UV-A + UV-E
Typical output 0 to 3 V	0 to 0.6 W/m ²	0 to 4 W/m ²	0 to 75 W/m ²	Each the same as for single band sensors
Response time (99%)	0.5 s			
Non-stability (change / year)	< 3 %			
Non-linearity (over full measurement range)	< 0.05 %			
Contribution at wavelengths > 400 nm	< 0.1 % of output			
Expected accuracy for daily sums	> 95 %			
Cosine response error	< 2.5 % (between 0° and 70° zenith angle)			

OTHER SPECIFICATIONS

Output	Analog voltage proportional to irradiance
Control output for internal temperature	2.5 V ~ 25 °C
Operating temperature range	-25 to + 50 °C, full spec. -40 to + 50 °C, reduced spec.
Supply voltage	7 – 18 VDC (8 W)
Zero offsets (no UV radiation exposure)	max +/- 2 mV
Impedance (nominal)	500 Ω
Expected signal output in atmospheric measurement conditions	max 3 V
Material	Case: protected aluminium, polyester coated; Dome: quartz
Cable	Length: Standard 10 m; Optional: 25 m Waterproof plug and socket



Kipp & Zonen B.V. reserve the right to alter specifications of the equipment described in this documentation without prior notice

SOLAR & ATMOSPHERIC SCIENCE

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