

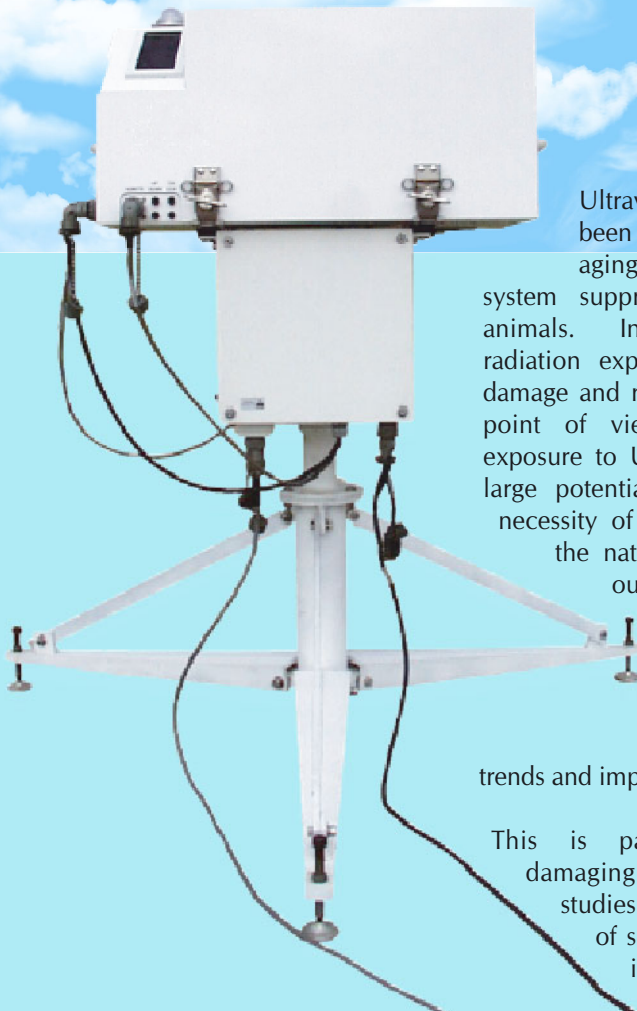
A Reference Instrument for UV Monitoring Networks:

The BREWER Spectrophotometer consists of a weatherproof spectrophotometer, azimuth tracker and stand. It provides near simultaneous observations of the total ozone column, SO₂, and UV spectra. The two-axis tracking, appropriate filter selections, on-board wavelength calibration and data logging are managed through internal electronics and an IBM compatible host computer. Control software for the PC enables 24hr scheduling and remote unattended operation.

The MKIII BREWER is sometimes called the "double" BREWER, due to its stacked spectrometer format. This distinguishes it from the MKII model, which has one spectrometer. The combination of the MKIII's double pass design, spectral filtering, and detector bandwidth reduce the effects of stray light to the lowest possible level making it a highly effective instrument for UV radiation studies.

BREWER

S P E C T R O P H O T O M E T E R



Ultraviolet (UV) radiation has been linked to skin cancer, skin aging, cataracts, and immune system suppression in humans and animals. In plants, enhanced UV radiation exposure has led to crop damage and reduced yields. From the point of view of risk assessment, exposure to UV radiation represents a large potential hazard. Although the necessity of UV monitoring is clear, the nature of the radiation and our sensitivity to it pose data collection challenges. If left unaddressed these challenges could leave our understanding of future UV trends and impacts uncertain.

This is particularly true with damaging ultraviolet (DUV) studies. Unless the spectrum of solar UV is well known it is difficult to relate UVA and UVB intensities to biological responses.

For reliable solar spectral UV irradiance measurement, instrumentation must possess specific qualities. The BREWER Spectrophotometer exemplifies these qualities and provides the means to understand solar UV radiation and its current and future impact on the biosphere.

BREWER Spectrophotometer
Why the leading UV and ozone researchers choose the MKIII:

Excellent stray light reduction
because solar UV intensities are low
High wavelength accuracy
because small wavelength shifts can be significant

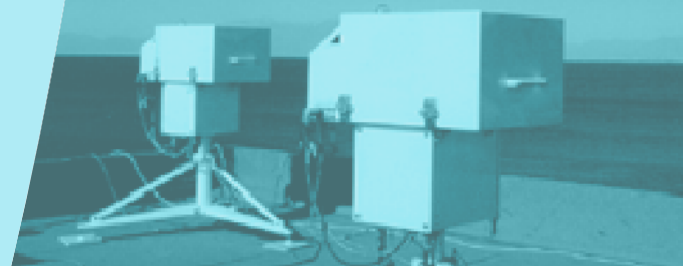
Appropriate wavelength range
natural UV input and erythral action spectrum (UV Index)

Superior long-term stability
absolute measurements demand stable, calibrated instruments, especially for UV trend detection

Non-variable instrument function
reduces systematic error

Directional response
cosine collector and direct sun port for detailed research

Automated celestial tracking
provides high accuracy total ozone column measurements anywhere.



BREWER

SPECTROPHOTOMETER

SPECIFICATIONS

System

Accuracy	- ± 1 % (for direct-sun total ozone)
Resolution	- 0.6 nm @ 303.2, 306.3, 310.1, 313.5, 316.8, 320.1 nm
Wavelength	- stability, ± 0.01 nm (over operating temperature) - precision, 0.006 ± 0.002 nm step-1 - range; 286.5-363 nm
Interface	- RS422 (15 m cable) / RS232 to computer
Detector	- low noise photomultiplier tube (PMT)
Optics	- modified dual Ebert spectrometers, focal length 16 cm, and aperture ratio F/6
Shutter Cycling	- 0.12 s / slit, 1.6 s total cycle time for 6 slits
Azimuth Tracking	- resolution, 0.02° step-1
Zenith Tracking	- resolution, 0.13° step-1
UV Scanning	- UV Port Assembly with a quartz dome and Teflon diffuser. Allows for spectral, integrated weighted irradiance (DUV), and non-weighted irradiance monitoring over the wavelength range (scans global UV 286.5 - 363 nm; DUV in mW/m ²).
Software	- Operating software

Internal Sources / Quality Assurance

Optical Stability	- internal Tungsten-halogen lamp, 20 W, 12 V
Wavelength Calibration	- internal Mercury germicidal lamp

Environmental

Operating Temperature:	
Minimum Internal Temperature	- $+5^\circ\text{C}$ (recommended)
Ambient Air Temperature	- 0°C to $+40^\circ\text{C}$ (without Insulated Cold Cover Option) - -50°C to $+40^\circ\text{C}$ (with Insulated Cold Cover Option)

Electrical

Power	- 3 A @ 80 to 140 VAC, 47 to 440 Hz - 1.5 A @ 160 to 264 VAC, 47 to 440 Hz
-------	---

Physical Dimensions:

Spectrometer	- 70 cm x 46 cm x 34 cm (weather proof enclosure)
Azimuth Tracker	- height, 91 cm - mechanical enclosure, 30 cm x 30 cm x 35 cm
Net Weight	- 35 kg (Spectrophotometer only) - 19 kg (Tracker only)

Additional Information

Integrated heater and fan promotes temperature stability and operation to -20°C (ambient).
Desiccant cartridge is accessible externally through Brewer base.
Kipp & Zonen offers on-site calibrations using Ozone and UV Travelling Standards.
Ozone and UV calibrations are recommended every year.

OPTIONS

UVB Stability Kit (External UV Lamp Kit)

- contains (5) tungsten halogen lamps; 50 W, 12 V

Insulated Cold Cover

- ambient temperatures -20°C to -50°C

Humidity Sensor

- outputs gm/m³ and RH% (internal)

Aluminum Transit Case

- available for Brewer Spectrophotometer

Communication Cable Extensions

- 15 m, 25 m, 50 m or 100 m

Computer System

- computer, monitor, and printer for use with Brewer

Software, Peripheral

- BREWVIEW - Kipp & Zonen

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

SOLAR & ATMOSPHERIC SCIENCE

WWW.KIPPZONEN.COM

Kipp & Zonen B.V.

Delftechpark 36, 2628 XH Delft
P.O. Box 507 2600 AM Delft
The Netherlands

T +31 (0)15 2755 210
F +31 (0)15 2620 351
E info@kippzonen.com

