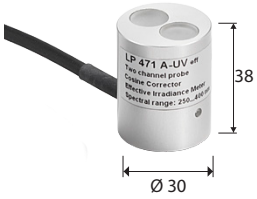
RADIOMETRIC-PHOTOMETRIC PROBES FOR PORTABLE INSTRUMENTS

Code	Description	
LP471PHOT	Photometric probe for measuring **ILLUMINANCE,** spectral response according to the photopic curve, class B according to CIE N° 69, cosine correction diffuser. Measuring range: 0.1 lux…200·10^3 lux.	
LP471LUM2	Photometric probe for measuring **LUMINANCE,** spectral response according to the photopic curve, angular field 2°. Measuring range: 1 cd/m^2…2000·10^3 cd/m^2.	
LP471PAR	Quantum-radiometric probe for measuring **PHOTONS FLOW** in the chlorophyll field **PAR** (photosynthetically Active Radiation 400 nm…700 nm), µmol $m^{-2}s^{-1}$ measure, cosine correction diffuser. Measuring range: 0.1 µmol $m^{-2}s^{-1}$…10·10^3 µmol $m^{-2}s^{-1}$	
LP471PAR02	Quantum-radiometric probe for measuring the **PHOTONS FLOW** in the chlorophyll field **PAR** (photosynthetically Active Radiation 400 nm…700 nm), µmol $m^{-2}s^{-1}$ measure, opaline quartz diffuser for cosine correction. The probe uses a special filter that optimizes the spectral response. Measuring range: 0.1 µmol $m^{-2}s^{-1}$…10·10^3 µmol $m^{-2}s^{-1}$.	
LP471RAD	Radiometric probe for measuring **IRRADIANCE** in the spectral range 400 nm…1050 nm, cosine correction diffuser. Measuring range: 1.0·10^{-3} W/m^2…2000 W/m^2.	
LP471UVA	Radiometric probe for measuring **IRRADIANCE** in the **UVA** spectral range 315 nm…400 nm, peak at 360 nm, quartz diffuser for cosine correction. Measuring range: 1.0·10^{-3} W/m^2 … 2000 W/m^2.	
LP471UVB	Radiometric probe for measuring **IRRADIANCE** in the **UVB** spectral range 280 nm…315 nm, peak at 305 nm…310 nm, quartz diffuser for cosine correction. Measuring range: 1.0·10^{-3} W/m^2 … 2000 W/m^2.	
LP471UVC	Radiometric probe for measuring **IRRADIANCE** in the **UVC** spectral range 220 nm…280 nm, peak at 260 nm, quartz diffuser for cosine correction. Measuring range: 1.0·10^{-3} W/m^2 … 2000 W/m^2.	
LP471UVBC	Radiometric probe for measuring the **IRRADIANCE** in the **UV-BC** spectral range 210 nm…355 nm, peak at 265 nm, quartz diffuser for cosine correction. Measuring range: 1.0·10^{-3} W/m^2 … 2000 W/m^2.	

RADIOMETRIC-PHOTOMETRIC PROBES FOR PORTABLE INSTRUMENTS

Code	Description	
LP471BLUE	Radiometric probe for measuring the **EFFECTIVE IRRADIANCE** in the spectral range of the **BLUE LIGHT** 380 nm…550 nm, diffuser for cosine correction. Measuring range: $1.0 \cdot 10^{-3}$ W/m^2 … 2000 W/m^2.	
LP471P-A	Combined probe for measuring **ILLUMINANCE** (lux), with standard photopic response, and **IRRADIANCE** (µW/cm^2) in the **UVA spectral range** (315…400 nm, with peak at 360 nm). Both the sensors are equipped with diffuser for the correction according to the cosine law. Illuminance measuring range: 0.3 lux … $200 \cdot 10^3$ lux. Irradiance measuring range: $1.0 \cdot 10^{-3}$ W/m^2… 2000 W/m^2. This probe provides the ratio between UVA irradiance and illuminance in µW/lumen (quantity of interest in museums).	
LP471A-UVeff	Combined probe for measuring the **TOTAL EFFECTIVE IRRADIANCE** (W/m^2) weighted according to the UV action curve. The probe is made of two sensors for the correct measure of the Total Effective Irradiance in the range 250…400 nm. Both these sensors are equipped with a diffuser for the correction according to the cosine law. This probe supplies the Total effective irradiance (E_{eff}), the UV-CB effective irradiance and the UVA irradiance. Total effective irradiance measuring range: 0.010 W/m^2 … 20 W/m^2. B_C effective irradiance measuring range: 0.010 W/m^2 … 20 W/m^2 UVA irradiance measuring range: 0.1 W/m^2 … 2000 W/m^2	
LP471 SILICON-PYRA	Pyranometer with silicon photodiode for measuring the **GLOBAL SOLAR IRRADIANCE**, diffuser for cosine correction. Spectral range 400…1100 nm. Measuring range: 0…2000 W/m^2. Fixed cable 5 m long with SICRAM module.	
LP471PYRA…	The probes LP471PYRA… consist of a pyranometer LPPYRA03, LPPYRA02 or LPPYRA10 and a SICRAM module equipped with a 5 m cable for the connection to the instruments DO9847, HD2102.1, HD2102.2, HD2302.0 and get a reading expressed directly in W/m^2. LPPYRA03 is a Spectrally Flat Class C (Second Class) pyranometer; LPPYRA02 is a Spectrally Flat Class B (First Class) pyranometer and LPPYRA10 is a Spectrally Flat Class A (Secondary Standard) pyranometer.	
LPBL	Base with levelling device (not suitable for LP471LUM2 and LP471PYRA… probes).	
LPBL3	Adjustable wall support for Ø 30 mm photometric and radiometric probes.	

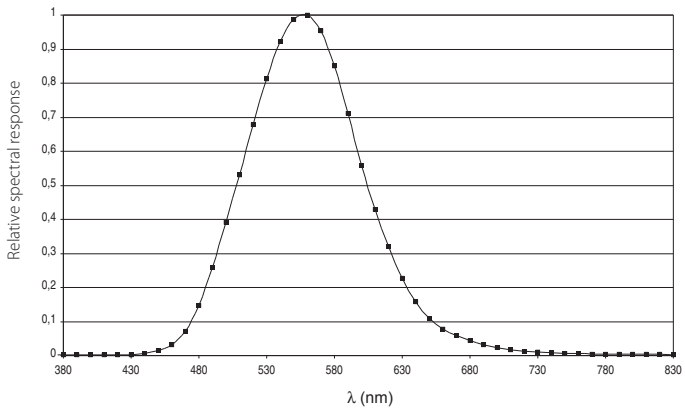
LP471PHOT - Probe for the measure of ILLUMINANCE				
Measuring range (lux):	0.10…199.99	…1999.9	…19999	…199.99·10³
Resolution (lux):	0.01	0.1	1	0.01·10³
Spectral range:	in agreement with standard photopic curve V(λ)			
Class	B			
Calibration uncertainty:	<4%			
f'_1 (in agreement with photopic response V(λ)):	<6%			
f_2 (response according to the cosine law):	<3%			
f_3 (linearity):	<1%			
f_4 (instrument reading error):	<0.5%			
f_5 (fatigue):	<0.5%			
α (temp. coefficient) f_6 (T)	<0.05%K			
Drift after 1 year:	<1%			
Working temperature:	0…50°C			
Reference Standards	CIE n.69 - UNI 11142			

Photometric probe for **ILLUMINANCE** measurement, spectral response in agreement with standard photopic vision, diffuser for cosine correction.
Measurement range: 0.10 lux…200·10³ lux.

LP471LUM2 - Probe for the measure of LUMINANCE				
Measuring range (cd/m²):	1.0…1999.9	…19999	…199.99·10³	…1999.9·10³
Resolution (cd/m²):	0.1	1	0.01·10³	0.1·10³
Optical angle:	2°			
Spectral range:	in agreement with standard photopic curve V(λ)			
Class:	C			
Calibration uncertainty:	<5%			
f'_1 (in agreement with photopic response V(λ)):	<8%			
f_3 (linearity):	<1%			
f_4 (instrument reading error):	<0.5%			
f_5 (fatigue):	<0.5%			
α (temp. coefficient) f_6 (T)	<0.05%K			
Drift after 1 year:	<1%			
Working temperature:	0…50°C			
Reference Standards:	CIE n.69 - UNI 11142			

Photometric probe for **LUMINANCE** measurement, spectral response in agreement with standard photopic vision, vision angle 2°.
Measurement range: 1 cd/m²…2000·10³ cd/m².

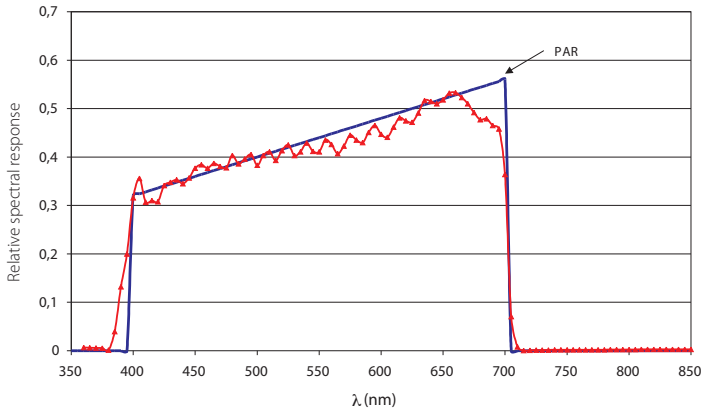
Typical response curve: LP471PHOT and LP471LUM2



LP471PAR - Quantum radiometric probe for the measure of the PHOTON FLOW across the chlorophyll range PAR			
Measuring range (μmol·m⁻²s⁻¹):	0.10…199.99	200.0…1999.9	2000…10000
Resolution (μmol·m⁻²s⁻¹):	0.01	0.1	1
Spectral range:	400 nm…700 nm		
Calibration uncertainty:	<5%		
f_2 (response according to the cosine law):	<6%		
f_3 (linearity):	<1%		
f_4 (instrument reading error):	±1digit		
f_5 (fatigue):	<0.5%		
Drift after 1 year:	<1%		
Working temperature:	0…50°C		

Quantum radiometric probe for the measurement of the photonflow across the chlorophyll range **PAR** (**Photosynthetically Active Radiation** 400 nm…700 nm), measurement in μmol/m²s.
Measurement range: 0.10 μmol·m⁻²s⁻¹…10·10³ μmol·m⁻²s⁻¹.

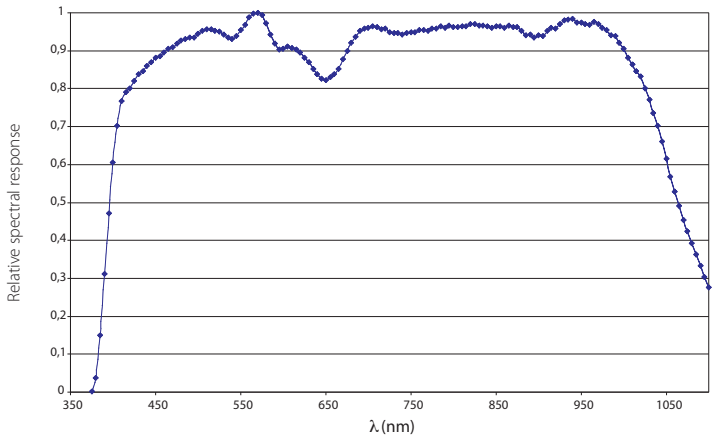
Typical response curve: LP471PAR



LP471RAD - Probe for the measure of IRRADIANCE				
Measuring range (W/m²):	1.0·10⁻³ …999.9·10⁻³	1.000…19.999	20.00…199.99	200.0…1999.9
Resolution (W/m²):	0.1·10⁻³	0.001	0.01	0.1
Spectral range:	400nm…1050nm			
Calibration uncertainty:	<5%			
f_2 (response according to the cosine law):	<6%			
f_3 (linearity):	<1%			
f_4 (instrument reading error):	±1digit			
f_5 (fatigue):	<0.5%			
Drift after 1 year:	<1%			
Working temperature:	0…50°C			

Radiometric probe for **IRRADIANCE** measurement in the spectral range 400 nm…1050 nm, diffuser for cosine correction.
Measurement range: 1.0·10⁻³ W/m²…2000 W/m².

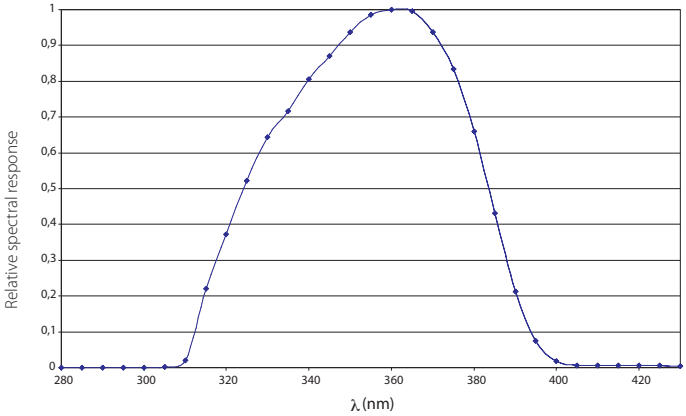
Typical response curve: LP471RAD



LP471UVA - Probe for the measure of UVA IRRADIANCE				
Measuring range (W/m²):	$1.0 \cdot 10^{-3}$ …$999.9 \cdot 10^{-3}$	1.000…19.999	20.00…199.99	200.0…1999.9
Resolution (W/m²):	$0.1 \cdot 10^{-3}$	0.001	0.01	0.1
Spectral range:	315 nm…400 nm (Peak 360nm)			
Calibration uncertainty:	<5%			
f_3 (linearity):	<1%			
f_4 (instrument reading error):	±1digit			
f_5 (fatigue):	<0.5%			
Drift after 1 year:	<2%			
Working temperature:	0…50°C			

Radiometric probe for **IRRADIANCE** measurement, in the **UVA** spectral range 315 nm…400 nm, peak 360 nm.
Measurement range: $1.0 \cdot 10^{-3}$ W/m²…2000 W/m².

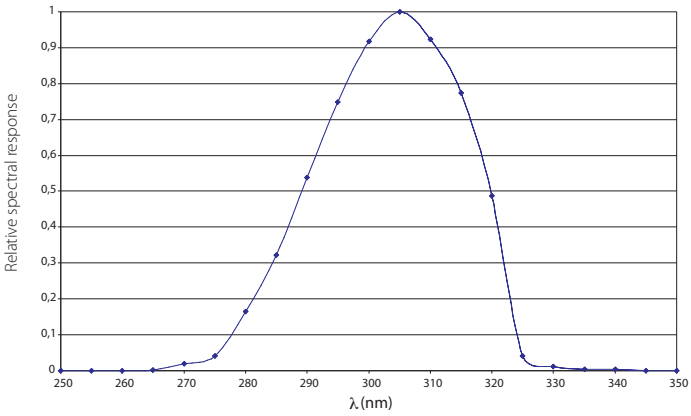
Typical response curve: LP471UVA



LP471UVB - Probe for the measure of UVB IRRADIANCE				
Measuring range (W/m²):	$1.0 \cdot 10^{-3}$ …$999.9 \cdot 10^{-3}$	1.000…19.999	20.00…199.99	200.0…1999.9
Resolution (W/m²):	$0.1 \cdot 10^{-3}$	0.001	0.01	0.1
Spectral range:	280nm…315nm (Peak 305nm…310nm)			
Calibration uncertainty:	<5%			
f_3 (linearity):	<2%			
f_4 (instrument reading error):	±1digit			
f_5 (fatigue):	<0.5%			
Drift after 1 year:	<2%			
Working temperature:	0…50°C			

Radiometric probe for **IRRADIANCE** measurement in the **UVB** spectral range 280 nm…315 nm, peak 305 nm…310 nm.
Measurement range: $1.0 \cdot 10^{-3}$ W/m²…2000 W/m².

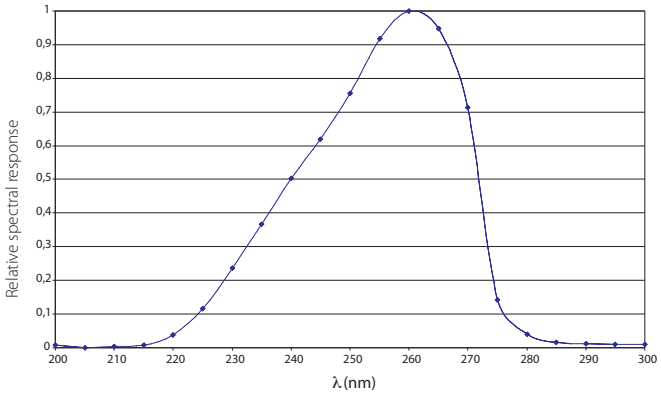
Typical response curve: LP471UVB



LP471UVC - Probe for the measure of UVC IRRADIANCE				
Measuring range (W/m²):	$1.0 \cdot 10^{-3}$ …$999.9 \cdot 10^{-3}$	1.000…19.999	20.00…199.99	200.0…1999.9
Resolution (W/m²):	$0.1 \cdot 10^{-3}$	0.001	0.01	0.1
Spectral range:	220nm…280nm (Peak 260nm)			
Calibration uncertainty:	<5%			
f_3 (linearity):	<1%			
f_4 (instrument reading error):	±1digit			
f_5 (fatigue):	<0.5%			
Drift after 1 year:	<2%			
Working temperature:	0…50°C			

Radiometric probe for **IRRADIANCE** measurement, in the **UVC** spectral range 220 nm…280 nm, peak 260 nm.
Measurement range: $1.0 \cdot 10^{-3}$ W/m²…2000 W/m².

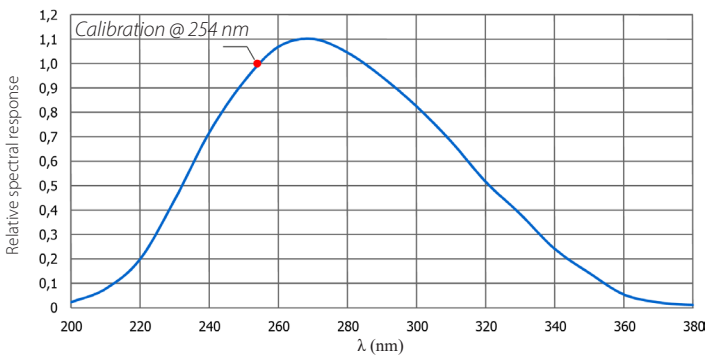
Typical response curve: LP471UVC



LP471UVBC - Probe for the measure of UV-BC IRRADIANCE				
Measuring range (W/m²):	$1.0 \cdot 10^{-3}$ …$999.9 \cdot 10^{-3}$	1.000…19.999	20.00…199.99	200.0…1999.9
Resolution (W/m²):	$0.1 \cdot 10^{-3}$	0.001	0.01	0.1
Spectral range:	210 nm…335 nm (Peak 265 nm)			
Calibration uncertainty:	<7% (calibration @ 254 nm)			
f_3 (linearity):	<2%			
f_5 (fatigue):	<0.5%			
Drift after 1 year:	<2%			
Working temperature:	0…50°C			

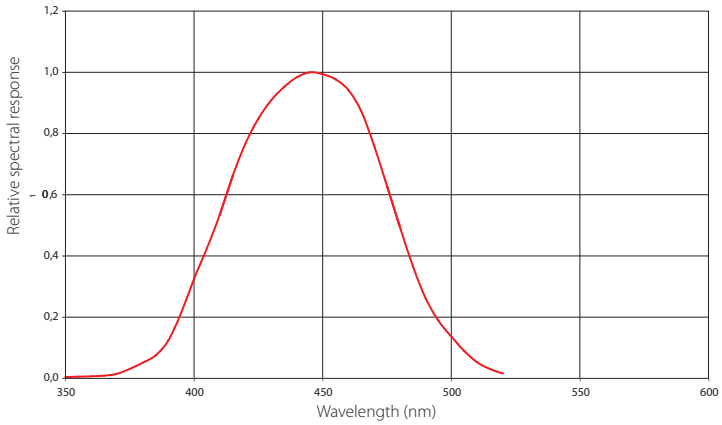
Radiometric probe for measuring the **IRRADIANCE** in the **UV-BC** spectral range 210 nm…355 nm, peak at 265 nm.
Measuring range: $1.0 \cdot 10^{-3}$ W/m² … 2000 W/m².

Typical response curve: LP471UVBC



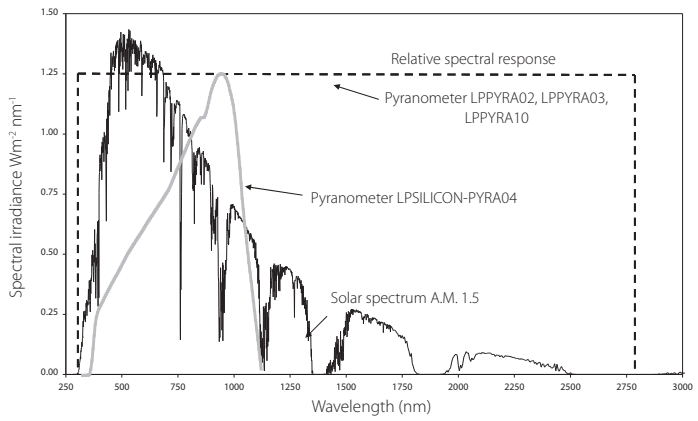
LP471BLUE - Probe for the measure of IRRADIANCE in spectral band of BLUE LIGHT				
Measurement range (W/m^2):	$1.0 \cdot 10^{-3}$… $999.9 \cdot 10^{-3}$	1.000…19.999	20.00…199.99	200.0…1999.9
Resolution (W/m^2):	$0.1 \cdot 10^{-3}$	0.001	0.01	0.01
Spectral range:	380 nm … 550 nm. Action curve for damages of Blue light B(λ)			
Calibration uncertainty:	<10%			
f_2 (response according to the cosine law):	<6%			
f_3 (linearity):	<3%			
f_4 (instrument reading error):	±1 digit			
f_5 (fatigue):	<0.5%			
Drift after 1 year:	<2%			
Working temperature:	0…50°C			

Relative spectral response



The radiometric probe **LP471BLUE** measures irradiance (W/m^2) in spectral band of blue light. The probe consists of a photodiode plus an appropriate filter and it is provided with diffuser for proper measure in accordance with the cosine law. The spectral response curve of the probe allows to measure the radiation effective for damages caused by blue light (curve B(λ) according to the standards ACGIH / ICNIRP) in the spectral range from 380 nm to 550 nm. The radiation optics in this portion of the spectrum can produce photochemical damage to the retina. Another field of application is the monitoring of the probe irradiance from blue light used in the treatment of neonatal jaundice.

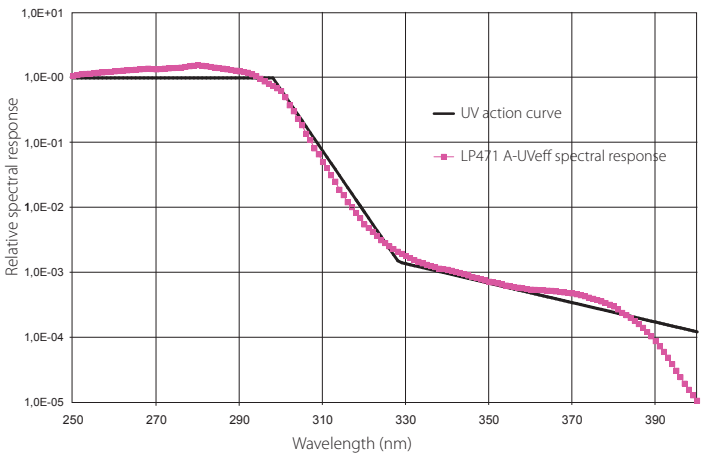
LP471SILICON-PYRA - Probe for the measure of GLOBAL SOLAR RADIATION				
Measurement range (W/m^2):	$1.0 \cdot 10^{-3}$… $999.9 \cdot 10^{-3}$	1.000…19.999	20.00…199.99	200.0…1999.9
Resolution (W/m^2):	$0.1 \cdot 10^{-3}$	0.001	0.01	0.1
Spectral range:	400 nm … 1100 nm			
Calibration uncertainty:	<3%			
f_2 (response according to the cosine law):	<3%			
f_3 (linearity):	<1%			
f_4 (instrument reading error):	±1 digit			
f_5 (fatigue):	<0.5%			
Drift after 1 year:	<2%			
Working temperature:	0…50°C			



LP471P-A - Combined probe with two sensors for the measure of ILLUMINANCE and UVA IRRADIANCE				
Illuminance				
Measuring range (lux):	0.3…199.9	…1999.9	…19999	…$199.99 \cdot 10^3$
Resolution (lux):	0.01	0.1	1	$0.01 \cdot 10^3$
Spectral range:	in agreement with standard photopic curve V(λ)			
α (temp. coefficient) f_6 (T)	<0.05%K			
Calibration uncertainty:	<4%			
f'_1 (in agreement with photopic response V(λ)):	<6%			
f_2 (response according to the cosine law):	<3%			
f_3 (linearity):	<1%			
f_4 (instrument reading error):	<0.5%			
f_5 (fatigue):	<0.5%			
Class:	B			
Drift after 1 year:	<1%			
Working temperature:	0…50°C			
Reference Standards:	CIE n.69 - UNI 11142			

Please refer to the spectral response of the LP471PHOT probe.

UVA Irradiance				
Measuring range ($\mu W/cm^2$):	0.10…199.99	…1999.9	…19999	…$199.99 \cdot 10^3$
Resolution ($\mu W/cm^2$):	0.01	0.1	1	$0.01 \cdot 10^3$
Spectral range:	315 nm…400 nm (Peak 360 nm)			
Calibration uncertainty:	<5%			
f_2 (response according to the cosine law):	<6%			
f_3 (linearity):	<1%			
f_4 (instrument reading error):	±1digit			
f_5 (fatigue):	<0.5%			
Drift after 1 year:	<2%			
Working temperature:	0…50°C			

Please refer to the spectral response of the LP471UVA probe.

LP471A-UVeff - Probe for the measure of TOTAL EFFECTIVE IRRADIANCE weighted according to the UV action curve (CEI EN 60335-2-27)	
Total Effective Irradiance	
Measuring range (W/m^2):	0.010 … 19.999
Resolution (W/m^2):	0.001
Spectral range:	UV action curve for measuring erythema (250 nm…400 nm)
Calibration uncertainty:	<15%
f_3 (linearity):	<3%
f_4 (instrument reading error):	±1 digit
f_5 (fatigue):	<0.5%
Drift after 1 year:	<2%
Working temperature:	0…50°C
UV Irradiance	
Measuring range (W/m^2):	0.1 … 1999.9
Resolution (W/m^2):	0.1
Spectral range:	315 nm … 400 nm
UV_BC Irradiance	
Measuring range (W/m^2):	0.010 … 19.999
Resolution (W/m^2):	0.001
Spectral range:	250 nm … 315 nm