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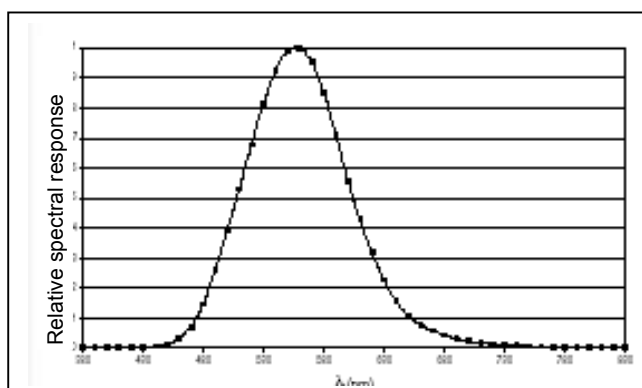


PROBES FOR PORTABLE PHOTO-RADIOMETERS

SONDAS FOTORADIOMETRICAS CON MODULO SICRAM

Para los instrumentos HD2302.0 HD2102.1 HD2102.2

MODELO	DESCRIPCION	FIGURA
LP471PHOT	Photometric probe for ILLUMINANCE measurement complete with SICRAM module, spectral response in agreement with standard photopic vision, diffuser for cosine correction. Measurement range: 0.01 lux...200x10 ³ lux.	 Dimensions Diameter 30 mm Height 38 mm.
LP471PAR	Quantum radiometric probe for the measurement of the photon flow across the chlorophyll range PAR (400nm...700nm) complete with SICRAM, measurement in µmol/m ² s, diffuser for cosine correction. Measurement range: 0.01µmol/m ² s...10x10 ³ µmol/m ² s.	
LP471RAD	Radiometric probe for IRRADIANCE measurement complete with SICRAM module; in the 400nm...1050nm spectral range, diffuser for cosine correction. Measurement range: 0.1x10 ⁻³ W/m ² ...2000 W/m ² .	
LP471UVA	Radiometric probe for IRRADIANCE measurement complete with SICRAM module; in the 315nm...400nm, peak 360nm, UVA spectral range, Measurement range: 0,1·10 ⁻³ W/m ² a 2000 W/m ²	
LP471UVB	Radiometric probe for IRRADIANCE measurement complete with SICRAM module; in the 280 nm a 315 nm peak de 305 nm. UVB spectral range, Measurement range: 0,1·10 ⁻³ W/m ² a 2000 W/m ²	
LP471UVC	Radiometric probe for IRRADIANCE measurement complete with SICRAM module; in the 220 nm a 280 nm peak de 260 nm. UVC spectral range, Measurement range: 0,1·10 ⁻³ W/m ² a 2000 W/m ²	
LP471ERY	Radiometric probe for TOTAL EFFECTIVE IRRADIANCE (Weff/m ²) according to the UV action curve (CEI EN 60335-2-27) complete with SICRAM module. Spectral range: 250 nm...400 nm, quartz diffuser for cosine correction. Measurement range 0,1·10 ⁻³ W _{ef} / m ² a 2000 W _{ef} / m ²	
LP471LUM2	Photometric probe for LUMINANCE measurement complete with SICRAM module, spectral response in agreement with standard photopic vision, vision angle 2°. Measurement range: 0.1 cd/m ² ...2000x10 ³ cd/m ² .	
LP BL	Base with levelling device for the probes.	
		



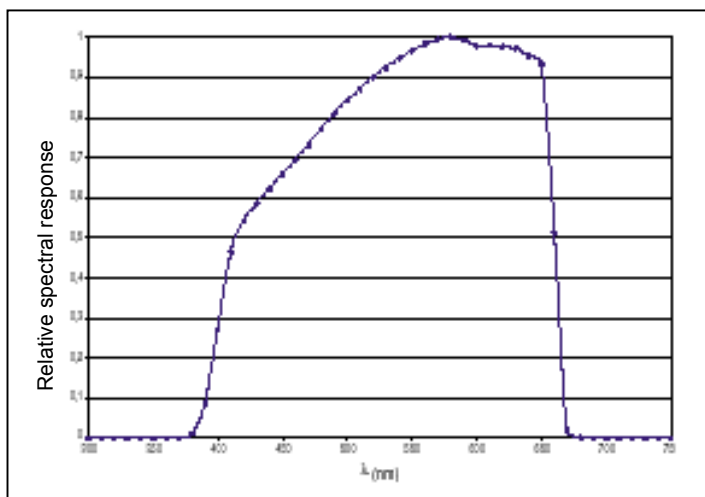
Typical response curve ILLUMINANCE - LUMINANCE

Technical characteristics of photometric and radiometric probes complete with SICRAM module equipped with the instruments

ILLUMINANCE measurement probe LP 471 PHOT				
Measurement range (lux):	0,01 to 199,99	1999,9	19999	$199,99 \times 10^3$
Resolution (lux):	0,01	0,1	1	$0,01 \times 10^3$
Spectral range: in agreement with standard photopic	in agreement with standard photopic curve $V(\lambda)$			
α (temp. coefficient) f_6 (T)	<0,05 %K			
Calibration uncertainty:	< 4 %			
f_1 ' (in agreement with photo- topic response $V(\lambda)$)	< 8 %			
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	C			
Drift after 1 year:	< 1 %			
Functioning temperature:	0 a 50 °C			
Reference Standards	CIE n° 69 – UNI11142			

LUMINANCE measurement probe LP 471 LUM 2				
Measurement range (cd/ m ²)	0,01 to 199,99	1999,9	19999	$199,99 \times 10^3$
Resolution (cd/ m ²)	0,01	0,1	1	$0,01 \times 10^3$
Optical angle:	2 °			
Spectral range	in agreement with standard photopic curve $V(\lambda)$			
α (temp. coefficient) f_6 (T)	<0,05 %K			
Calibration uncertainty:	< 4 %			
f_1 ' (in agreement with photo- topic response $V(\lambda)$)	< 8 %			
f_3 (linearity):	< 1 %			
f_4 (instrument reading error):	< 0,5 %			
f_5 (fatigue):	< 0,5 %			
Class	C			
Drift after 1 year:	< 1 %			
Functioning temperature:	0 to 50 °C			
Reference Standards	CIE n° 69 – UNI11142			

Quantum radiometric probe for the measurement of the photon flow across the chlorophyll range PAR LP 471 PAR			
Measurement range ($\mu\text{mol/ m}^2 \text{ s}$)	0,01 to 199,99	200,0 a 1999,9	2000 a 10000
Resolution ($\mu\text{mol/ m}^2 \text{ s}$)	0,01	0,1	1
Spectral range	400 to 700 nm		
Calibration uncertainty:	< 5 %		
f_2 (response according to the cosine law):	< 6 %		
f_3 (linearity):	< 1 %		
f_4 (instrument reading error):	± 1 digit		
f_5 (fatigue):	< 0,5 %		
Drift after 1 year:	< 1 %		
Functioning temperature:	0 to 50 °C		



Typical response curve PAR

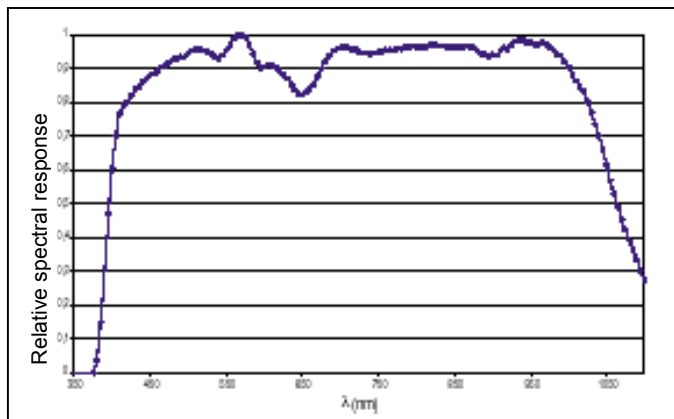
IRRADIANCE measurement probe LP 471 RAD				
Measurement range (W/ m ²)	0,1x10 ⁻³ a 999,9x10 ⁻³	1,000 a 19,999	20,00 a 199,99	200,0 a 1999,9
Resolution (W/ m ²)	0,1x10 ⁻³	001,1	0,01	0,1
Spectral range	400 to 1050 nm			
Calibration uncertainty:	< 5 %			
f ₂ (response according to the cosine	< 6 %			
f ₃ (linearity):	< 1 %			
f ₄ (instrument reading error):	±1 digit			
f ₅ (fatigue):	< 0,5 %			
Drift after 1 year:	< 1 %			
Functioning temperature:	0 to 50 °C			

IRRADIANCE measurement probe LP 471 UVA				
Measurement range (W/ m ²)	0,1x10 ⁻³ to 999,9x10 ⁻³	1,000 to 19,999	20,00 to 199,99	200,0 to 1999,9
Resolution (W/ m ²)	0,1x10 ⁻³	001,1	0,01	0,1
Spectral range	315 to 400 nm (Peak 360 nm)			
Calibration uncertainty:	< 5 %			
f ₂ (response according to the cosine	< 6 %			
f ₃ (linearity):	< 1 %			
f ₄ (instrument reading error):	±1 digit			
f ₅ (fatigue):	< 0,5 %			
Drift after 1 year:	< 2 %			
Functioning temperature:	0 to 50 °C			

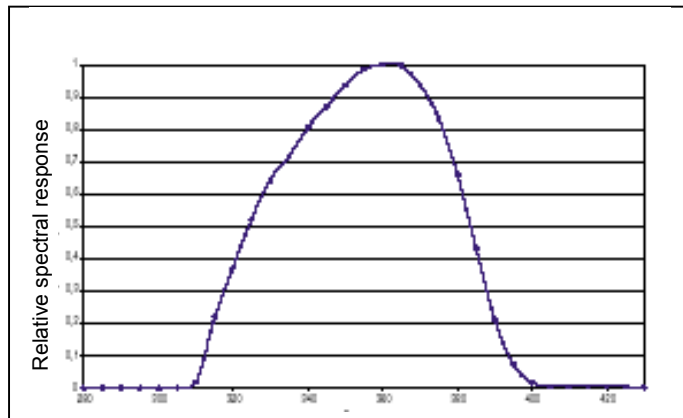
IRRADIANCE measurement probe LP 471 UVB				
Measurement range (W/ m ²)	0,1x10 ⁻³ to 999,9x10 ⁻³	1,000 to 19,999	20,00 to 199,99	200,0 to 1999,9
Resolution (W/ m ²)	0,1x10 ⁻³	001,1	0,01	0,1
Spectral range	280 a 315 nm (Peak 305 nm)			
Calibration uncertainty:	< 5 %			
f ₂ (response according to the cosine	< 6 %			
f ₃ (linearity):	< 2 %			
f ₄ (instrument reading error):	±1 digit			
f ₅ (fatigue):	< 0,5 %			
Drift after 1 year:	< 2 %			
Functioning temperature:	0 to 50 °C			

IRRADIANCE measurement probe LP 471 UVC				
Measurement range (W/ m ²)	0,1x10 ⁻³ to 999,9x10 ⁻³	1,000 to 19,999	20,00 to 199,99	200,0 to 1999,9
Resolution (W/ m ²)	0,1x10 ⁻³	001,1	0,01	0,1
Spectral range	220 a 280 nm (Peak 260 nm)			
Calibration uncertainty:	< 5 %			
f ₂ (response according to the cosine	< 6 %			
f ₃ (linearity):	< 1 %			
f ₄ (instrument reading error):	±1 digit			
f ₅ (fatigue):	< 0,5 %			
Drift after 1 year:	< 2 %			
Functioning temperature:	0 to 50 °C			

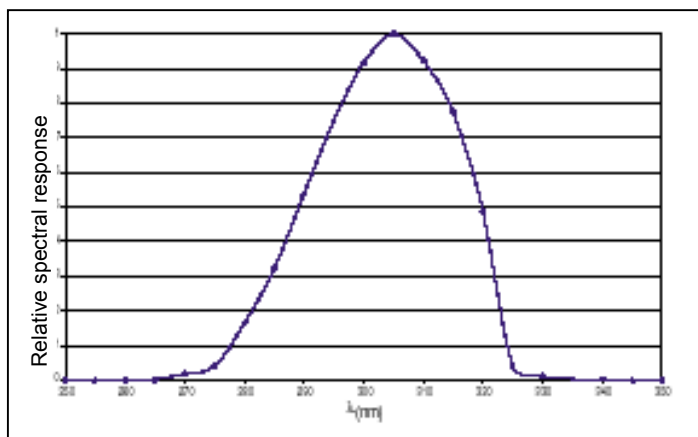
Measurement probe LP 471ERY of TOTAL EFFECTIVE IRRADIANCE (W/m ²) according to the UV action curve UV (CEI EN 60335-2-27)				
Measurement range (W/ m ²)	0,1x10 ⁻³ to 999,9x10 ⁻³	1,000 to 19,999	20,00 to 199,99	200,0 to 1999,9
Resolution (W/ m ²)	0,1x10 ⁻³	001,1	0,01	0,1
Spectral range	UV action curve for erythema measurement (250 a 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 %			
Functioning temperature:	0 a 50 °C			
Reference Standards	CEI EN 60335-2-27			



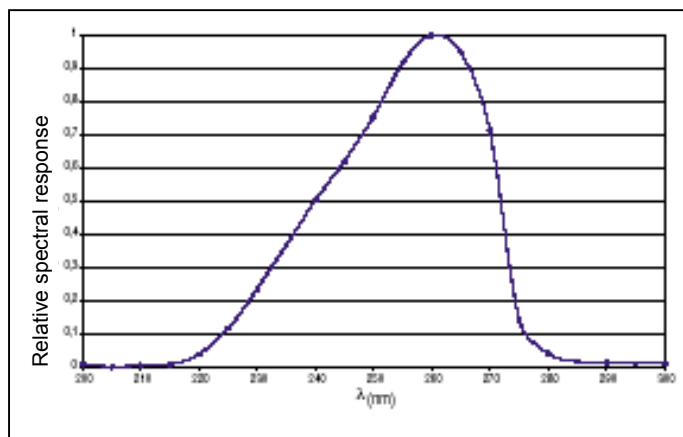
Typical response curve RAD



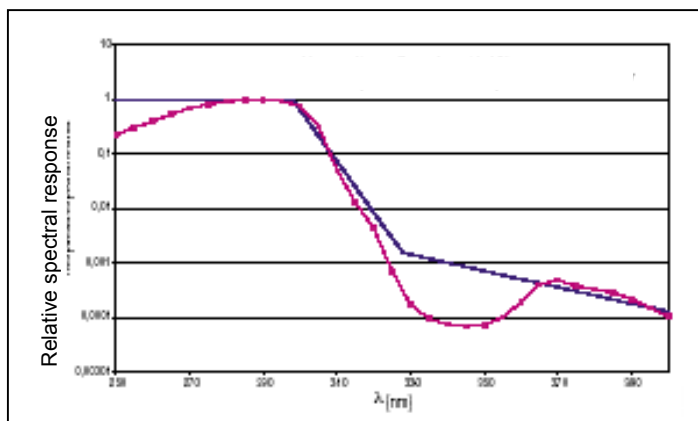
Typical response curve UVA



Typical response curve UVB



Typical response curve UVC



Typical response curve TOTAL EFFECTIVE IRRADIANCE

Continuous line = UV action curve
Dotted line = Spectral sensitivity probe LP471ERY

The probe **LP 9021 ERY** measures the total effective irradiance (W_{eff}/m^2) according to the UV action curve (CEI EN 60335-2-27). A particular type of photodiode and a combination of special filters bring the spectral response closer to the UV action curve..

CEI EN 60335-2-27 standards establish a maximum allowable dose of $100J/m^2$ for first-time exposure and an annual dose of $15000J/m^2$.
The typical spectral response curve of LP 9021 ERY is shown in the Figure together with the UV action curve

The typical spectral response curve of the probe ERY LP 9021 (dotted line, red) is reproduced in the chart next to the UV action curve (solid line, blue)

The good accordance between the two curves enables the instrument to take reliable measurements of different types of lamps (and filters) used at present for tanning machines. Each probe is individually calibrated at DeltaOhm photoradiometry laboratory by means of a double monochrome.

Calibration is performed at 290 nm through a SIT calibrated reference photodiode.

SONDAS FOTORADIOMETRICAS PARA EL DO 9721

MODELO	DESCRIPCION	FIGURA
LP9021PHOT	Photometric probe for ILLUMINANCE measurement complete with SICRAM module, spectral response in agreement with standard photopic vision, diffuser for cosine correction. Measurement range: 0.01 lux...200x10 ³ lux.	 Dimensions Diameter 30 mm Height 38 mm.
LP9021PAR	Radiometric probe for measuring IRRADIANCE in the region of PAR radiations 400 nm a 700 nm),. Measurement range 0,1 μmol/m ² ·s a 20·10 ³ μmol/m ² ·s	
LP90211RAD	Radiometric probe for measuring the IRRADIANCE of artificial light sources, irradiance of the sun. 450 nm a 950 nm, Measurement range 0,1·10 ⁻³ W/m ² a 2000 W/m ²	
LP9021UVA	Radiometric probe for measuring IRRADIANCE in the ultraviolet field. Suitable for measuring radiation in the ultraviolet region A. 315 nm to 400nm peak of 360 nm. Measurement range 0,1·10 ⁻³ W/m ² a 2000 W/m ²	
LP471UVB	Radiometric probe for measuring IRRADIANCE in the ultraviolet field. Suitable for measuring radiation in the ultraviolet region B.280 nm to 315 nm peak of 305 nm. Measurement range 0,1·10 ⁻³ W/m ² a 2000 W/m ²	
LP471UVC	Radiometric probe for measuring IRRADIANCE in the ultraviolet field. Suitable for measuring radiation in the ultraviolet region BC220 nm to 280nm peak of 260 nm. Measurement range 0,1·10 ⁻³ W/m ² a 2000 W/m ²	
LP9021ERY	Radiometric probe for TOTAL EFFECTIVE IRRADIANCE (W_{eff}/m^2) according to the UV action curve (CEI EN 60335-2-27) complete with SICRAM module. Spectral range: 250 nm...400 nm, quartz diffuser for cosine correction Measurement range 0,1·10 ⁻³ W_{eff}/m^2 a 2000 W_{eff}/m^2	
LP9021LUM6	Probe for measuring LUMINANCE, measuring range from 1 to 1999 x 103 candles/ m ² . Measuring angle 6°. CIE filter for correction of the response according to the human eye. Measurement range 1 cd/m ² a 2000·10 ³ cd/m ² . Dimensions Diameter 40 mm Height 160 mm.	
LP BL	Base with levelling device for the probes.	