

Датчики (зонды) радиометрические-фотометрические для портативных приборов DELTA ОНМ серии LP471

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RADIOMETRIC-PHOTOMETRIC PROBES FOR PORTABLE INSTRUMENTS

COD.	Description	
LP471PHOT	Photometric probe for measuring the ILLUMINANCE , spectral response according to the photopic curve, class B according to CIE N° 69 , cosine correction diffuser. Measuring range: 0.10 lux...200·10 ³ lux.	
LP471LUM2	Photometric probe for measuring the LUMINANCE , spectral response according to the photopic curve, angular field 2°. Measuring range: 1.0 cd/m ² ...2000·10 ³ cd/m ² .	
LP471PAR	Quantum-radiometric probe for measuring the PHOTONS FLOW in the chlorophyll field PAR (photosynthetically Active Radiation 400nm...700 nm), μmol m ⁻² s ⁻¹ measure, cosine correction diffuser. Measuring range 0.10 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...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 the IRRADIANCE in the spectral range 400nm...1050nm, cosine correction diffuser. Measuring range: 1.0·10 ⁻³ mW/m ² ...2000 W/m ² .	
LP471UVA	Radiometric probe for measuring the IRRADIANCE in the UVA spectral range 315nm...400nm, peak at 360nm, quartz diffuser for cosine correction. Measuring range: 1.0·10 ⁻³ mW/m ² ... 2000 W/m ² .	
LP471UVB	Radiometric probe for measuring the IRRADIANCE in the UVB spectral range 280nm...315nm, peak at 305nm ... 310nm, quartz diffuser for cosine correction. Measuring range: 1.0·10 ⁻³ mW/m ² ... 2000 W/m ² .	
LP471UVC	Radiometric probe for measuring the IRRADIANCE in the UVC spectral range 220nm...280nm, peak at 260nm, quartz diffuser for cosine correction. Measuring range: 1.0·10 ⁻³ W/m ² ... 2000 W/m ² .	

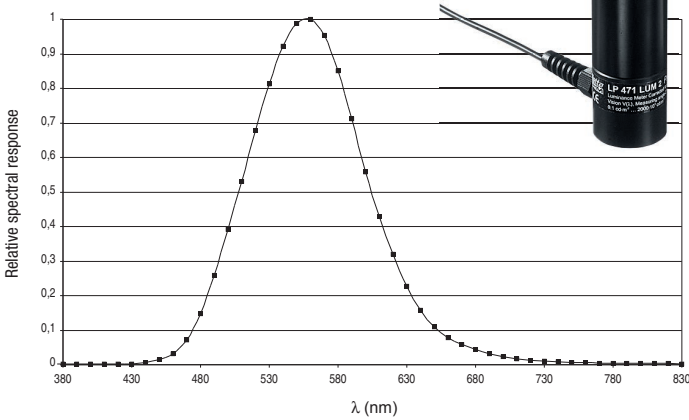
RADIOMETRIC-PHOTOMETRIC PROBES FOR PORTABLE INSTRUMENTS

COD.	Description	
LP471BLUE	Radiometric probe for measuring the EFFECTIVE IRRADIANCE in the spectral range of the Blue light 380nm...550nm, diffuser for cosine correction. Measuring range: $1.0 \cdot 10^{-3} \text{ W/m}^2 \dots 2000 \text{ W/m}^2$.	
LP471P-A	Combined probe for measuring ILLUMINANCE (lux), with standard photopic response, and IRRADIANCE ($\mu\text{W/cm}^2$) 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: $0.10 \text{ lux} \dots 200 \cdot 10^3 \text{ lux}$. Irradiance measuring range: $1.0 \text{ mW/m}^2 \dots 2000 \text{ W/m}^2$. This probe provides the ratio between UVA irradiance and illuminance in $\mu\text{W/lumen}$ (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...400nm. Both these sensors are equipped with a diffuser for the correction according to the cosine law. This probe supplies the Total effective irradiance (Eeff), the UV-CB effective irradiance and the UVA irradiance. Total effective irradiance measuring range: $0.010 \text{ W/m}^2 \dots 20 \text{ W/m}^2$. B_C effective irradiance measuring range: $0.010 \text{ W/m}^2 \dots 20 \text{ W/m}^2$ UVA irradiance measuring range: $0.1 \text{ W/m}^2 \dots 2000 \text{ W/m}^2$	
LP471 Silicon-Pyra	Pyranometer with silicon photodiode for measuring the GLOBAL SOLAR IRRADIANCE , diffuser for cosine correction. Spectral range 400...1100 nm. Measuring range: $1.0 \cdot 10^{-3} \dots 2000 \text{ W/m}^2$. Fixed cable 5m long, with SICRAM module.	
LP471PYRA	The probes LP 471 PYRA... consist of a pyranometer LP PYRA 03, LP PYRA 02 or LP PYRA 10 and a SICRAM module equipped with a 5 or 10m cable for the connection to the instruments D09847, HD2102.1, HD2102.2, HD2302.0 and get a reading expressed directly in W/m^2 . LP PYRA 03 is a second class pyranometer; LP PYRA 02 is a first class pyranometer; LP PYRA 10 is a "Secondary Standard" pyranometer.	
LP BL	Supporting and leveling base for the LP471... probes. NOT suitable for LP 471 LUM2 and LP 471 PYRA.	
LP BL3	Adjustable wall support for the LP471... probes. NOT suitable for LP 471 LUM2 and LP 471 PYRA.	

LP 471 LUM 2 probe for the measure of LUMINANCE				
Measuring range (cd/m ²):	1.0...1999.9	...19999	...199.99·10 ³	...1999.9·10 ³
Resolution (cd/m ²):	0.1	1	0.01·10 ³	0.1·10 ³
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: 1.0 cd/m²...2000·10³ cd/m².

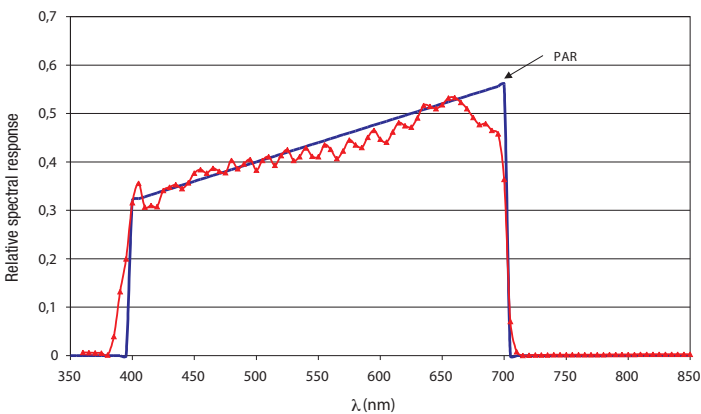
Typical response curve: LP 471 PHOT and LP 471 LUM2



LP 471 PAR quantum radiometric probe for the measure of the photon flow across the chlorophyll range PAR			
Measuring range (μmol·m ⁻² ·s ⁻¹):	0.10...199.99	200.0...1999.9	2000...10000
Resolution (μmol·m ⁻² ·s ⁻¹):	0.01	0.1	1
Spectral range:	400nm...700nm		
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%		
Working temperature:	0...50°C		

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

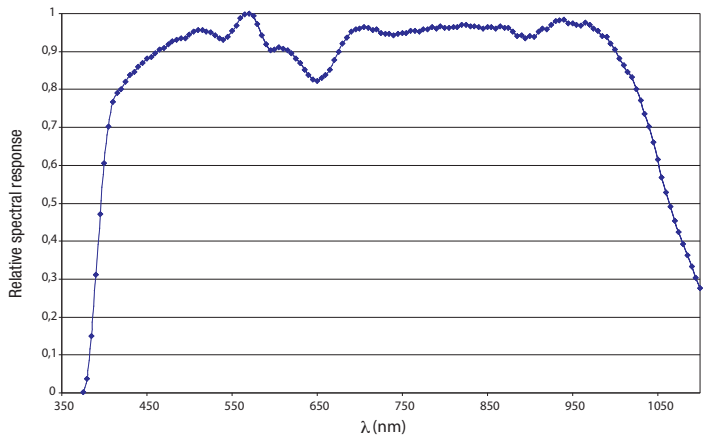
Typical response curve: LP 471 PAR



LP 471 RAD probe for the measure of IRRADIANCE				
Measuring range (W/m ²):	1.0·10 ⁻³ ...999.9·10 ⁻³	1.000...19.999	20.00...199.99	200.0...1999.9
Resolution (W/m ²):	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):	±1 digit			
f ₅ (fatigue):	<0.5%			
Drift after 1 year:	<1%			
Working temperature:	0...50°C			

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

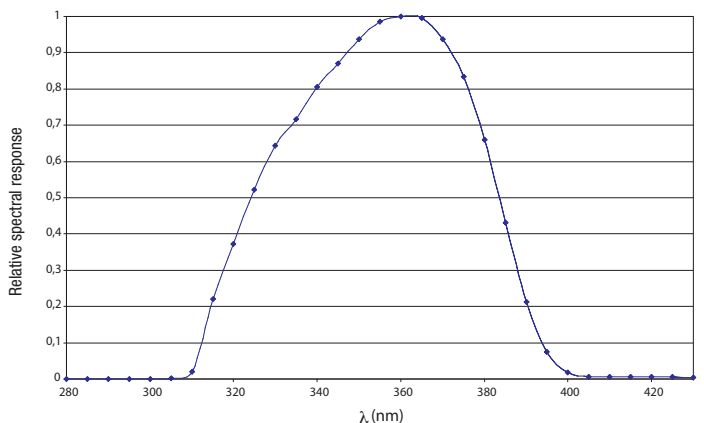
Typical response curve: LP 471 RAD



LP 471 UVA probe for the measure of UVA IRRADIANCE				
Measuring range (W/m ²):	1.0·10 ⁻³ ...999.9·10 ⁻³	1.000...19.999	20.00...199.99	200.0...1999.9
Resolution (W/m ²):	0.1·10 ⁻³	0.001	0.01	0.1
Spectral range:	315nm...400nm (Peak 360nm)			
Calibration uncertainty:	<5%			
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			

Radiometric probe for **IRRADIANCE** measurement, in the 315nm...400nm, peak 360nm, **UVA** spectral range. Measurement range: 1.0·10⁻³W/m²...2000W/m².

Typical response curve: LP 471 UVA

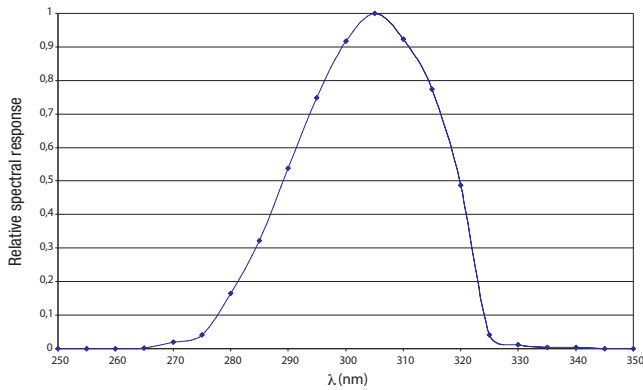


LP 471 UVB probe for the measure of UVB IRRADIANCE				
Measuring range (W/m ²):	1.0·10 ⁻³ ...999.9·10 ⁻³	1.000...19.999	20.00...199.99	200.0...1999.9
Resolution (W/m ²):	0.1·10 ⁻³	0.001	0.01	0.1
Spectral range:	280nm...315nm (Peak 305nm...310nm)			
Calibration uncertainty:	<5%			
f ₃ (linearity):	<2%			
f ₄ (instrument reading error):	±1 digit			
f ₅ (fatigue):	<0.5%			
Drift after 1 year:	<2%			
Working temperature:	0...50°C			

Radiometric probe for **IRRADIANCE** measurement, in the spectral range 280nm...315nm, peak 305nm ... 310nm, Measurement range: 1.0·10⁻³W/m²...2000W/m².



Typical response curve: LP 471 UVB

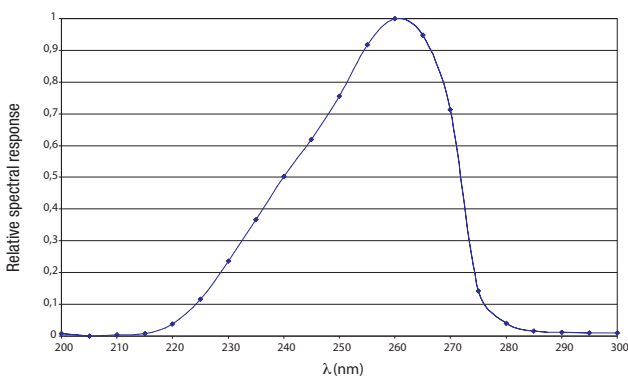


LP 471 UVC probe for the measure of UVC IRRADIANCE				
Measuring range (W/m ²):	1.0·10 ⁻³ ...999.9·10 ⁻³	1.000...19.999	20.00...199.99	200.0...1999.9
Resolution (W/m ²):	0.1·10 ⁻³	0.001	0.01	0.1
Spectral range:	220nm...280nm (Peak 260nm)			
Calibration uncertainty:	<5%			
f ₃ (linearity):	<1%			
f ₄ (instrument reading error):	±1 digit			
f ₅ (fatigue):	<0.5%			
Drift after 1 year:	<2%			
Working temperature:	0...50°C			

Radiometric probe for **IRRADIANCE** measurement, in the spectral range 220nm...280nm, peak 260nm, **UVC**. Measurement range: 1.0·10⁻³W/m²...2000W/m².



Typical response curve: LP 471 UVC



Combined probe LP 471 P-A with two sensors for the measure of ILLUMINANCE and UVA IRRADIANCE				
<i>Illuminance</i>				
Measuring range (lux):	0.10...199.9	...1999.9	...19999	...199.99·10 ³
Resolution (lux):	0.01	0.1	1	0.01·10 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			

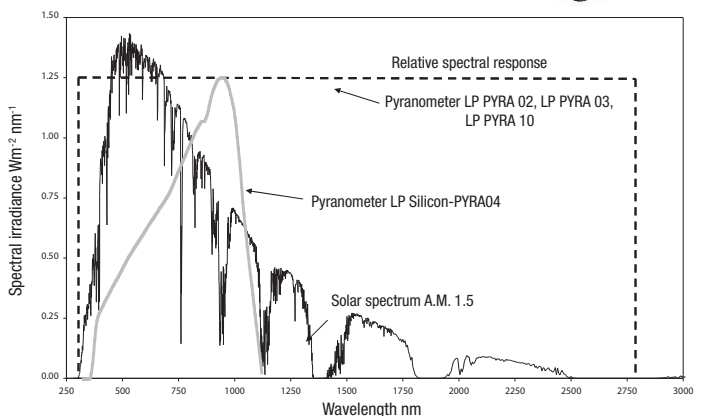
Please refer to the spectral response of the LP471PHOT probe

<i>UVA Irradiance</i>				
Measuring range (μW/cm ²):	0.10...199.99	...1999.9	...19999	...199.99·10 ³
Resolution (μW/cm ²):	0.01	0.1	1	0.01·10 ³
Spectral range:	315nm...400nm (Peak 360nm)			
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:	<2%			
Working temperature:	0...50°C			

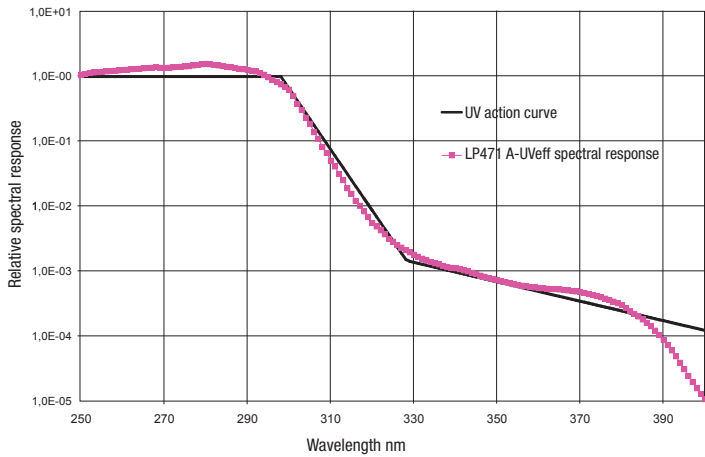
Please refer to the spectral response of the LP471UVA probe



LP SILICON-PYRA probe for the measure of GLOBAL SOLAR RADIATION				
Measurement range (W/m ²):	1.0·10 ⁻³ ... 999.9·10 ⁻³	1.000...19.999	20.00...199.99	200.0...1999.9
Resolution (W/m ²):	0.1·10 ⁻³	0.001	.01	0.01
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			

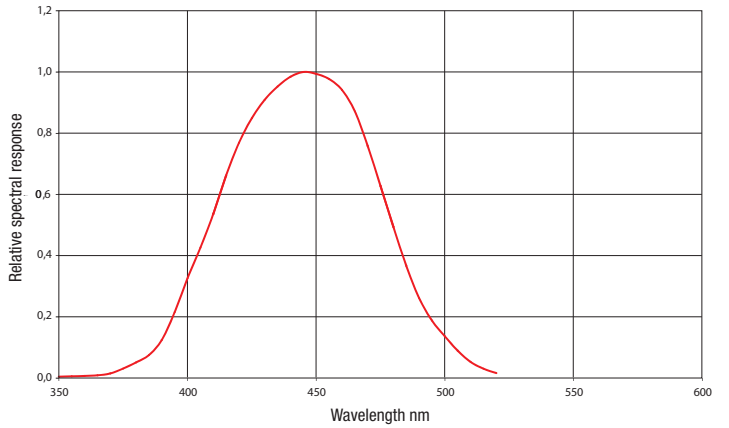


LP 471 A-Uveff probe for the measure of TOTAL EFFECTIVE IRRADIANCE weighted according to the UV action curve (CEI EN 60335-2-27)	
<i>Total Effective Irradiance</i>	
Measuring range (W_{eff}/m^2):	0.010 ... 19.999
Resolution (W_{eff}/m^2):	0.001
Spectral range:	UV action curve for measuring erythema (250 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
<i>UV Irradiance</i>	
Measuring range (W_{eff}/m^2):	0.1 ... 1999.9
Resolution (W_{eff}/m^2):	0.1
Spectral range:	315 nm ... 400 nm
<i>UV_BC Irradiance</i>	
Measuring range (W_{eff}/m^2):	0.010 ... 19.999
Resolution (W_{eff}/m^2):	0.001
Spectral range:	250 nm ... 315 nm



LP 471 BLUE probe for the measure of IRRADIANCE in spectral band of BLUE LIGHT				
Measurement range (W/m^2):	1.0·10 ⁻³ ... 999.9·10 ⁻³	1.000 ... 19.999	20.00 ... 199.99	200.0 ... 1999.9
Resolution (W/m^2):	0.1·10 ⁻³	0.001	.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 LP 471-BLUE 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 380nm to 550nm. 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.

LP 471 PHOT probe for the measure of ILLUMINANCE				
Measuring range (lux):	0.10...199.99	...1999.9	...19999	...199.99·10 ³
Resolution (lux):	0.01	0.1	1	0.01·10 ³
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.



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