Integrating Sphere
LMT UL

- Integrating spheres in variable configurations for measurement of luminous flux as well as colorimetrics of light sources with LMT colorimeters and spectroradiometers
- Standard sizes:
  - UL 1000 – 1000 mm Ø, UL 1650 – 1650 mm Ø, UL 2250/1650 – 2250/1650 mm Ø
- Highly accurate spectral throughput of photometer and coating ensuring minimum spectral mismatch indices against both conventional and LED light sources
- LMT PHP coating with perfectly uniform spectral response across the visible spectrum
- Exterior mounted bench for testing of forward emitting light sources in 2π orientation

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Photometer LMT U 1000

Technical Data according to DIN 5032 part 8 and CIE S023/E:2013

Marking	LMT U 1000 Photometer					
Field of application	· High precision measurement of luminous flux for employment with LMT Integrating Spheres · LMT Integrating Spheres for colorimetrics with LMT Tristimulus Colorimeters and Spectroradiometers on request					
Classification	Class L instrument according to DIN 5032 part 7 for photometer without sphere					
Display range	**Version**	**Number of ranges**	**UL 1000**		**UL 1650 | UL 1650/2250**	
			max	**min**	**max**	**min**
	standard	5	19 999 x 10^{1} lm	1 x 10^{-3} lm	19 999 x 10^{2} lm	1 x 10^{-2} lm
	extended	6	19 999 x 10^{1} lm	1 x 10^{-4} lm	19 999 x 10^{2} lm	1 x 10^{-3} lm
	Ranges graduated in steps of ten, all ranges overload protected					
Photometer Head	· P 30 SCT OR with ultra-stable SI-photoelement, built-in flush with inner surface of sphere · Connection to measuring console by plug-in cable · Spatial evaluation: without cosine-correction · Thermostatic stabilization: built-in · Light sensitive surface: 30 mm diameter · Special equipment: individual test-report for V(λ)-match					
Measuring Console	· Transducer: precision operational amplifier · Integration time: 100 ms, t_a = 200 ms · Conversion rate of A/D-converter: about 2.5 readings · Switching time of autoranging system: 400 ms · Time of response t_{max}: 1.0 s · Display: LED display, 0 – 1 999 digit with decimal point and unit display · Range selection: manually, automatically or remote controlled · Digital data output: BCD output (TTL level), IEEE-488 interface optionally · Analogue output 0 – 1 999 mV, source resistance < 500 Ω · Electrical operated: mains · Attenuator / multiplier: 4 digit attenuator, disconnectable · Specials: power supply for auxiliary lamp, precision readout for sphere inside temperature					
Maximum errors and qualities according to DIN EN 13032-1, DIN 5032-7 and CIE S023/E:2013	· V(λ)-adaption: f'_1 < 1.0 % · UV-response: u < 0.1 % · IR-response: r < 0.1 % · Spatial evaluation: f_2 < – (no cosine-correction) · Error by non-linearity: f_3 < 0.1 % ± 1 digit · Error by display-unit: f_4 < 0.1 % · Temperature coefficient: α_0 ≤ 0.01 %/K · Fatigue: f_5 < 0.1 %, measured at 2 000 lx · Error due to modulated light: f_7 < 0.1 % · Range change: f_{11} < 0.1 % · Lower frequency limit: f_u < 25 Hz · Upper frequency limit: f_o > 100 kHz					
Calibration	· Provided for calibration setting in lumen by use of a luminous flux standard lamp · Uncertainty of calibration according to uncertainty of used standard lamp					
Electrical supply	· Rated supply voltage: 230 V ± 10 %, optionally 115 V ± 10 % · Power consumption: < 50 VA · Rated frequency: 50 Hz, range 45 to 60 Hz					
Environmental specifications	· Operating temperature range: +5 to +45°C · Storage temperature range: –10 to +60°C · Relative humidity: 10 to 90 %, non condensing					
Dimensions	· Measuring console: 485 mm x 310 mm x 133 mm(W x D x H) · Photometer head: 50 mm in diameter, height approximately 55 mm · Length of cable: 3 m					
Weight	· Measuring console: approximately 5 kg · Photometer head: approximately 0.2 kg					
For options of color measuring equipment please request the data sheets of LMT Tristimuls Colorimeters and / or LMT Spectral Color Measurement System LMT SM 8000 UL						