

**Photometry and Radiometry, New-Zealand, MSL (Measurement Standards Laboratory)**



Note: Approval dates are shown only for the CMCs published after 24 May 2004

Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/ Independent Variable		Expanded Uncertainty					NMI Service Identifier	Comments
Quantity	Instrument or Artefact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage factor	Level of Confidence	Is the expanded uncertainty a relative one?		
Luminous intensity	Tungsten lamp	Reference photometer	10	5000	cd	Correlated colour temperature	2700 K to 3000 K	0.8	%	4.3	95%	Yes	MSLT.O.025	
Illuminance responsivity, tungsten source	Illuminance meter	Standard lamp			A/lx or V/lx or reading/lx	Illuminance	10 lx to 3000 lx	0.8	%	4.3	95%	Yes	MSLT.O.001 & MSLT.O.016	
						Correlated colour temperature	2700 K to 3000 K							
Luminance responsivity	Luminance meter	Tungsten-based source			A/(cd m <sup>-2</sup> ), V/(cd m <sup>-2</sup> ), Reading/(cd m <sup>-2</sup> )	Luminance	2 cd m <sup>-2</sup> to 800 cd m <sup>-2</sup>	1.4	%	2.4	95%	Yes	MSLT.O.002	Approved on 27 September 2004
						Type of source used	illuminant A							
Responsivity, spectral, power	Broadband detector	Monochromator and reference detectors			A/W	Wavelength range	280 nm to 450 nm	2.0	%	2.2	95%	Yes	MSLT.O.009	
						Bandwidth	1 nm to 5 nm							
						Power level	0.1 µW to 10 µW							
Responsivity, spectral, power	Broadband detectors, silicon diode or silicon diode trap	Monochromator and reference detectors			A/W	Wavelength range	450 nm to 900 nm	0.2	%	2.2	95%	Yes	MSLT.O.009	Approved on 27 September 2004
						Bandwidth	1 nm to 5 nm							
						Power level	0.1 µW to 10 µW							

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Responsivity, spectral, power	Broadband detectors, silicon diode or silicon diode trap	Cryogenic radiometer and laser			A/W	Wavelengths	Ar and Kr lines, 488 nm to 752 nm	0.022	%	2.2	95%	Yes	MSLT.O.023	Approved on 27 September 2004
						Power level	50 $\mu$ W to 250 $\mu$ W							
Correlated colour temperature	Tungsten lamp	Standard lamp and spectroradiometer	2700	3000	K			50	K	2	95%	No	MSLT.O.013	
Irradiance, spectral	Tungsten lamp	Standard lamp and spectroradiometer	0.001	0.5	$W m^{-2} nm^{-1}$	Wavelength range	280 nm to 300 nm	6	%	2.2	95%	Yes	MSLT.O.021	Approved on 27 September 2004
						Bandwidth	1 nm to 3 nm							
Irradiance, spectral	Tungsten lamp	Standard lamp and spectroradiometer	0.001	0.5	$W m^{-2} nm^{-1}$	Wavelength range	300 nm to 450 nm	3	%	2.2	95%	Yes	MSLT.O.021	Approved on 27 September 2004
						Bandwidth	1 nm to 3 nm							
Irradiance, spectral	Tungsten lamp	Standard lamp and spectroradiometer	0.001	0.5	$W m^{-2} nm^{-1}$	Wavelength range	450 nm to 830 nm	1.7	%	2.2	95%	Yes	MSLT.O.021	Approved on 27 September 2004
						Bandwidth	1 nm to 3 nm							
Transmittance, regular, spectral	Spectrally-neutral material	Spectrophotometer	0.0001	0.01		Wavelength range	380 nm to 1000 nm	0.00005		2	95%	No	MSLT.O.006	Approved on 27 September 2004
						Bandwidth	1 nm to 3 nm							
Transmittance, regular, spectral	Spectrally-neutral material	Spectrophotometer	0.01	1.0		Wavelength range	380 nm to 1000 nm	0.5	%	2	95%	Yes	MSLT.O.006	Approved on 27 September 2004
						Bandwidth	1 nm to 3 nm							

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Reflectance, diffuse, spectral	Spectrally-neutral material	Spectrophotometer	0.05	0.8		Wavelength range	360 nm to 820 nm	0.01		2	95%	No	MSLT.O.024	Approved on 27 September 2004
						Bandwidth	1 nm to 3 nm							
						Specific measurement conditions	0 deg / diffuse, 6 deg / diffuse							
Reflectance, diffuse, spectral	Spectrally-neutral material	Spectrophotometer	0.8	1		Wavelength range	360 nm to 820 nm	1	%	2	95%	Yes	MSLT.O.024	Approved on 27 September 2004
						Bandwidth	1 nm to 3 nm							
						Specific measurement conditions	0 deg / diffuse, 6 deg / diffuse							
Reflectance, regular, spectral	Spectrally-neutral material	Spectrophotometer	0.05	1		Wavelength range	280 nm to 800 nm	1	%	2	95%	Yes	MSLT.O.026	Approved on 27 September 2004
						Bandwidth	1 nm to 3 nm							
						Specific measurement conditions	0 deg / 0 deg							
Colour, surface x,y	Diffusely-reflecting material	Spectroradiometer	CIE x,y colour space			Specific measurement conditions	45 deg / 0 deg	0.003		2	95%	No	MSLT.O.010	Approved on 27 September 2004
Colour, surface Y	Diffusely-reflecting material	Spectroradiometer	Y: 0.1	1		Specific measurement conditions	45 deg / 0 deg	5	%	2	95%	Yes	MSLT.O.010	Approved on 27 September 2004

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Quantity	Instrument or Artefact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage factor	Level of Confidence	Is the expanded uncertainty a relative one?		
Colour transmitted x,y	General material	Spectrophotometer / spectroradiometer	CIE x,y colour space			Specific measurement conditions	0 deg / 0 deg	0.005		2	95%	No	MSLT.O.005, MSLT.O.006	Approved on 27 September 2004
Colour transmitted Y	General material	Spectrophotometer / spectroradiometer	Y: 0.1	1		Specific measurement conditions	0 deg / 0 deg	5	%	2	95%	Yes	MSLT.O.005, MSLT.O.006	Approved on 27 September 2004