

CLASSIFICATION OF SERVICES IN PHOTOMETRY AND RADIOMETRY

Version No 17, 10 July 2023

METROLOGY AREA: PHOTOMETRY AND RADIOMETRY

Note 1:

The services numbering given in this text is the one which is used by National Metrology Institutes for drawing up their CMC files in the field of Photometry and Radiometry. To facilitate the selection of services via the database search engine, this metrology area is split up into four different branches: "Photometry", "Properties of detectors and sources", "Properties of materials", and "Fiber optics". It follows that services corresponding to number "5", which are relevant to detectors and sources, are given here before services corresponding to number "4", which are relevant to materials.

Note 2:

In the following, the service numbered as "a.b.c" is described under the form:

a. Field

a.b Measured quantity

a.b.c Instrument or artefact: *parameter(s) in italic*

or - for BRANCH: FIBRE OPTICS:

a.b.c Sub-quantity (if any), instrument, or artefact: *parameter(s) in italic*

BRANCH: PHOTOMETRY

1. Photometry

1.1. Luminous intensity

1.1.1 Tungsten lamp: *correlated colour temperature or distribution temperature*

1.2. Illuminance responsivity

1.2.1 Tungsten source, illuminance meter: *illuminance, correlated colour temperature or distribution temperature*

1.3. Luminous flux

1.3.1 Tungsten lamp: *correlated colour temperature or distribution temperature*

1.3.2 LED: *geometric measurement conditions (partial, full), peak wavelength (or white)*

1.4. Illuminance

1.4.1 Tungsten lamp: *correlated colour temperature or distribution temperature*

1.5. Luminance

1.5.1 Tungsten-based source: *correlated colour temperature or distribution temperature*

1.6. Luminance responsivity

1.6.0 Luminance meter: *luminance, type of source used*

1.7. Averaged luminous intensity

1.7.1 LED: *geometric measurement conditions, peak wavelength (or white)*

1.8. Luminous exposure

1.8.0 General source: *type of source*

1.8.1 Flash photometer: *luminous exposure, type of source used*

BRANCH: PROPERTIES OF DETECTORS AND SOURCES

2. Properties of detectors

2.1 Responsivity, spectral, power

2.1.1 Broad band detector: *wavelength range, bandwidth, power level*

2.2 Responsivity, spectral, irradiance

2.2.1 Not attributed

2.2.2 Broad band detector: *wavelength range, bandwidth, power level*

2.2.3 Spectroradiometer: *wavelength range, bandwidth, power level*

2.3 Responsivity, spectral, radiance

2.3.0 Spectroradiometer: *wavelength range, bandwidth, power level*

2.4 Responsivity, laser, power

2.4.0 General detector: *wavelength range, power level, type of detector*

2.5 Responsivity, laser, energy

2.5.0 General detector: *wavelength range, energy level, type of detector*

2.6 Responsivity, solar, power

2.6.0 General detector: *power level, type of detector*

2.7 Responsivity, solar, irradiance

2.7.0 General detector: *irradiance level, type of detector*

2.7.1 Broadband detector: *irradiance level, spectral range, type of source, geometrical conditions, atmospheric conditions*

- 2.8 Responsivity, blackbody, total irradiance**
 - 2.8.0 Broadband detector: *irradiance level, distribution temperature, type of detector*
- 2.9 Responsivity, UV, broadband irradiance**
 - 2.9.0 UV radiometer: *wavelength range, irradiance level, type of source*
- 2.10 Responsivity, UV, broadband radiant exposure**
 - 2.10.0 UV radiometer: *wavelength range, irradiance level, exposure time, type of source*
- 2.11 Responsivity, solar, spectral, irradiance**
 - 2.11.0 Solar spectroradiometer: *wavelength range, bandwidth, power level*
- 2.12 Responsivity, terrestrial irradiance**
 - 2.12.1 Broadband detector: *irradiance level, bandwidth*
- 3. Spectral emission properties of sources**
 - 3.1 Irradiance, spectral**
 - 3.1.1 Tungsten lamp: *wavelength range, bandwidth*
 - 3.1.2 Deuterium lamp: *wavelength range, bandwidth*
 - 3.2 Radiance, spectral**
 - 3.2.1 Tungsten lamp *wavelength range, bandwidth,*
 - 3.2.2 Deuterium lamp: *wavelength range, bandwidth*
 - 3.2.3 General source: *wavelength range, bandwidth, type of source*
 - 3.3 Power, spectral total radiant**
 - 3.3.1 Laser: *wavelength range, type of laser*
 - 3.4 Radiant intensity, spectral**
 - 3.4.1 Tungsten lamp: *wavelength range, bandwidth*
 - 3.4.2 Deuterium lamp: *wavelength range, bandwidth*
 - 3.5 Radiant flux, spectral**
 - 3.5.0 General source: *geometric measurement conditions (partial, full), wavelength range, bandwidth, type of source*
 - 3.5.1 Tungsten lamp: *geometric measurement conditions (partial, full), wavelength range, bandwidth*
- 5. Spectrally-integrated measurements for sources and detectors**
 - 5.1 Distribution temperature**
 - 5.1.0 Tungsten lamp
 - 5.2 Correlated colour temperature**
 - 5.2.1 Tungsten lamp
 - 5.3 Correlated colour temperature response**
 - 5.3.0 Colour temperature meter: *colour temperature range, type of source*
 - 5.4 Colour, emitted**
 - 5.4.0 General source, colour space: x, y: *bandwidth, type of source*
 - 5.4.1 General source, colour space: u, v: *bandwidth, type of source*
 - 5.4.2 General source, colour space: u-prime, v-prime: *bandwidth, type of source*
 - 5.4.3 Display, colour space: $L^*a^*b^*$: *bandwidth, type of display*
 - 5.5 Chromaticity response**
 - 5.5.0 Colorimeter: *type of source*
 - 5.6 Colour rendering, Ra**
 - 5.6.0 General source: *type of source*
 - 5.7 Radiance, total**
 - 5.7.0 Blackbody: *distribution temperature, aperture area, pressure*
 - 5.8 Radiant flux, total**
 - 5.8.0 General source: *geometric measurement conditions (partial, full), wavelength range*
 - 5.8.1 LED: *geometric measurement conditions (partial, full), peak wavelength range*

BRANCH: PROPERTIES OF MATERIALS

- 4. Spectral properties of materials**
 - 4.1 Transmittance, regular, spectral**
 - 4.1.1 Spectrally-neutral material: *wavelength range, bandwidth, specific measurement conditions*
 - 4.2 Transmittance, diffuse, spectral**
 - 4.2.1 Spectrally-neutral material: *wavelength range, bandwidth, specific measurement conditions*
 - 4.3 Absorbance, regular, spectral**
 - 4.3.1 Spectrally-neutral material: *wavelength range, bandwidth, specific measurement conditions*
 - 4.4 Absorbance, diffuse, spectral**
 - 4.4.1 Spectrally-neutral material: *wavelength range, bandwidth, specific measurement conditions*
 - 4.5 Reflectance, diffuse, spectral**
 - 4.5.1 Spectrally-neutral material: *wavelength range, bandwidth, specific measurement conditions*

4.6 Reflectance, regular, spectral

4.6.1 Spectrally-neutral material: *wavelength range, bandwidth, specific measurement conditions*

4.7 Reflectance, hemispherical, spectral

4.7.1 Spectrally-neutral material: *wavelength range, bandwidth, specific measurement conditions*

4.8 Not attributed

4.9 Emissivity

4.9.0 General material: *wavelength range, temperature, specific measurement conditions*

4.10 Emittance, spectral

4.10.0 General material: *wavelength range, temperature, specific measurement conditions*

4.11 BRDF

4.11.0 General material: *wavelength range, specific measurement conditions*

4.12 Reflectance factor

4.12.0 General material: *specification standard used*

4.13 Radiance factor

4.13.0 General material: *wavelength range, specific measurement conditions, type of source used*

4.13.1 Fluorescent material: *wavelength range, specific measurement conditions, type of source used*

4.14 Luminescent radiance factor

4.14.0 Fluorescent material: *wavelength range, specific measurement conditions*

4.15 Wavelength

4.15.0 Spectrally-selective transmitting material: *wavelength / wavenumber range, bandwidth*

4.15.1 Spectrally-selective reflecting material: *wavelength / wavenumber range, bandwidth*

4.16 Refractive index, spectral

4.16.0 Solid material: *wavelength, temperature, specific measurement conditions*

4.17 Angle of rotation of plane of polarization, spectral

4.17.0 Solid material: *wavelength, temperature*

4.17.1 Liquid material: *wavelength, temperature*

4.18 Ellipsometric angles ψ , Δ , spectral

4.18.0 General material: *wavelength range, type of material*

6. Colour and other spectrally-integrated measurements of materials

6.1 Colour, surface, x , y , Y

6.1.0 General material: *specific measurement conditions, type of material*

6.1.1 Fluorescent material: *type of source used, specific measurement conditions, type of fluorescent material*

6.1.2 Diffusely reflecting material

6.2 Colour, surface, L^*a^*b

6.2.0 General material: *specific measurement conditions, type of material*

6.2.1 Fluorescent material: *irradiation conditions, specific measurement conditions, type of fluorescent material*

6.2.2 Diffusely reflecting material

6.3 Colour, transmitted, x , y , Y

6.3.0 General material: *specific measurement conditions, type of material*

6.4 Colour, transmitted, L^*a^*b

6.4.0 General material: *specific measurement conditions, type of material*

6.5 Retroreflectance

6.5.0 General material: *specification standard used*

6.6 Gloss

6.6.0 General material: *specification standard used*

6.7 Haze

6.7.0 General material: *specification standard used*

6.8 Not attributed 6.9 Luminance factor

6.9.0 General material: *type of source used, specific measurement conditions*

6.10 Luminance coefficient

6.10.0 General material: *type of source used, specific measurement conditions, type of material*

6.11 Not attributed 6.12 Whiteness

6.12.0 General material: *specification standard used*

BRANCH: FIBRE OPTICS

7. Fibre optics

7.1 Responsivity

7.1.0 Fibre optic power meter: *wavelength or wavelength range, bandwidth, power level*

7.2 Wavelength

7.2.0 Fibre optic source: *wavelength or wavelength range*

7.2.1 Optical spectrum analyser: *wavelength or wavelength range*

7.2.2 Wavelength meter: *wavelength or wavelength range*

7.2.3 Wavelength standard: *wavelength or wavelength range*

7.3 Modal properties

7.3.0 Encircled flux, fibre optic source or fibre: *wavelength, fibre type*

7.3.1 Encircled flux, measuring instrument: *specification standard used*

7.3.2 Mode field diameter (MFD), optical fibre: *wavelength, fibre type*

7.2.3 Numerical aperture, optical fibre: *wavelength, fibre type*

7.4 Not attributed

7.5 Attenuation

7.5.0 Spectral attenuation, optical fibre: *wavelength range*

7.5.1 Loss, optical fibre component: *wavelength or wavelength range*

7.5.2 Loss, measuring instrument: *wavelength or wavelength range*

7.6 Not attributed

7.7 Chromatic dispersion

7.7.0 Dispersion, optical fibre: *wavelength range*

7.7.1 Zero dispersion wavelength, optical fibre: *wavelength range*

7.7.2 Dispersion slope, optical fibre: *wavelength range*

7.7.3 Dispersion, measuring instrument: *wavelength range*

7.7.4 Zero dispersion wavelength, measuring instrument: *wavelength range*

7.7.5 Dispersion slope, measuring instrument: *wavelength range*

7.8 Polarization Mode Dispersion

7.8.0 Optical fibre: *wavelength range*

7.8.1 Measuring instrument: *wavelength range, specification standard used*

7.8.2 Artefact: *wavelength range, mode coupling*

7.9 Not attributed

7.10 Length

7.10.0 Length, optical fibre: *wavelength range, index of refraction*

7.10.1 Location offset, OTDR: *wavelength, pulse width, distance range, index of refraction, specification standard used*

7.10.2 Distance scale deviation, OTDR: *wavelength, pulse width, distance range, index of refraction, specification standard used*