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CIE Illuminants A and D65 (cont.)

λ (nm)	CIE Ill. A	CIE Ill. D65
475	45.517400	115.39200
480	48.242300	115.92300
485	51.041800	112.36700
490	53.913200	108.81100
495	56.853900	109.08200
500	59.861100	109.35400
505	62.932000	108.57800
510	66.063500	107.80200
515	69.252500	106.29600
520	72.495900	104.79000
525	75.790300	106.23900
530	79.132600	107.68900
535	82.519300	106.04700
540	85.947000	104.40500
545	89.412400	104.22500
550	92.912000	104.04600
555	96.442300	102.02300
560	100.000000	100.00000
565	103.582000	98.16710
570	107.184000	96.33420
575	110.803000	96.06110
580	114.436000	95.78800
585	118.080000	92.23680
590	121.731000	88.68560
595	125.386000	89.34590
600	129.043000	90.00620
605	132.697000	89.80260
610	136.346000	89.59910
615	139.988000	88.64890
620	143.618000	87.69870
625	147.235000	85.49360
630	150.836000	83.28860
635	154.418000	83.49390
640	157.979000	83.69920
645	161.516000	81.86300
650	165.028000	80.02680

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CIE Illuminants A and D65 (cont.)

λ (nm)	CIE Ill. A	CIE Ill. D65
655	168.510000	80.12070
660	171.963000	80.21460
665	175.383000	81.24620
670	178.769000	82.27780
675	182.118000	80.28100
680	185.429000	78.28420
685	188.701000	74.00270
690	191.931000	69.72130
695	195.118000	70.66520
700	198.261000	71.60910
705	201.359000	72.97900
710	204.409000	74.34900
715	207.411000	67.97650
720	210.365000	61.60400
725	213.268000	65.74480
730	216.120000	69.88560
735	218.920000	72.48630
740	221.667000	75.08700
745	224.361000	69.33980
750	227.000000	63.59270
755	229.585000	55.00540
760	232.115000	46.41820
765	234.589000	56.61180
770	237.008000	66.80540
775	239.370000	65.09410
780	241.675000	63.38280
785	243.924000	63.84340
790	246.116000	64.30400
795	248.251000	61.87790
800	250.329000	59.45190
805	252.350000	55.70540
810	254.314000	51.95900
815	256.221000	54.69980
820	258.071000	57.44060
825	259.865000	58.87650
830	261.602000	60.31250

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$\bar{x}, \bar{y}, \bar{z}, V(\lambda)$, and $V'(\lambda)$

Note: The photopic efficiency function, $V(\lambda)$, is identical to the $\bar{y}$ standard observer function.

λ (nm)	$\bar{x}$	$\bar{y}$, V	$\bar{z}$	V'
360	0.000130	0.000004	0.000606	0.000000
365	0.000232	0.000007	0.001086	0.000000
370	0.000415	0.000012	0.001946	0.000000
375	0.000742	0.000022	0.003486	0.000000
380	0.001368	0.000039	0.006450	0.000000
385	0.002236	0.000064	0.010550	0.001108
390	0.004243	0.000120	0.020050	0.002209
395	0.007650	0.000217	0.036210	0.004530
400	0.014310	0.000396	0.067850	0.009290
405	0.023190	0.000640	0.110200	0.018520
410	0.043510	0.001210	0.207400	0.034840
415	0.077630	0.002180	0.371300	0.060400
420	0.134380	0.004000	0.645600	0.096600
425	0.214770	0.007300	1.039050	0.143600
430	0.283900	0.011600	1.385600	0.199800
435	0.328500	0.016840	1.622960	0.262500
440	0.348280	0.023000	1.747060	0.328100
445	0.348060	0.029800	1.782600	0.393100
450	0.336200	0.038000	1.772110	0.455000
455	0.318700	0.048000	1.744100	0.513000
460	0.290800	0.060000	1.669200	0.567000
465	0.251100	0.073900	1.528100	0.620000
470	0.195360	0.090980	1.287640	0.676000
475	0.142100	0.112600	1.041900	0.734000
480	0.095640	0.139020	0.812950	0.793000
485	0.057950	0.169300	0.616200	0.851000
490	0.032010	0.208020	0.465180	0.904000
495	0.014700	0.258600	0.353300	0.949000
500	0.004900	0.323000	0.272000	0.982000
505	0.002400	0.407300	0.212300	0.998000
510	0.009300	0.503000	0.158200	0.997000

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$\bar{x}, \bar{y}, \bar{z}, V(\lambda)$, and $V'(\lambda)$ (cont.)

λ (nm)	$\bar{x}$	$\bar{y}, V$	$\bar{z}$	V'
515	0.029100	0.608200	0.111700	0.975000
520	0.063270	0.710000	0.078250	0.935000
525	0.109600	0.793200	0.057250	0.880000
530	0.165500	0.862000	0.042160	0.811000
535	0.225750	0.914850	0.029840	0.733000
540	0.290400	0.954000	0.020300	0.650000
545	0.359700	0.980300	0.013400	0.564000
550	0.433450	0.994950	0.008750	0.481000
555	0.512050	1.000000	0.005750	0.402000
560	0.594500	0.995000	0.003900	0.328800
565	0.678400	0.978600	0.002750	0.263900
570	0.762100	0.952000	0.002100	0.207600
575	0.842500	0.915400	0.001800	0.160200
580	0.916300	0.870000	0.001650	0.121200
585	0.978600	0.816300	0.001400	0.089900
590	1.026300	0.757000	0.001100	0.065500
595	1.056700	0.694900	0.001000	0.046900
600	1.062200	0.631000	0.000800	0.033150
605	1.045600	0.566800	0.000600	0.023120
610	1.002600	0.503000	0.000340	0.015930
615	0.938400	0.441200	0.000240	0.010880
620	0.854450	0.381000	0.000190	0.007370
625	0.751400	0.321000	0.000100	0.004970
630	0.642400	0.265000	0.000050	0.003335
635	0.541900	0.217000	0.000030	0.002235
640	0.447900	0.175000	0.000020	0.001497
645	0.360800	0.138200	0.000010	0.001005
650	0.283500	0.107000	0.000000	0.000677
655	0.218700	0.081600	0.000000	0.000459
660	0.164900	0.061000	0.000000	0.000313
665	0.121200	0.044580	0.000000	0.000215
670	0.087400	0.032000	0.000000	0.000148
675	0.063600	0.023200	0.000000	0.000103
680	0.046770	0.017000	0.000000	0.000072

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$\bar{x}$, $\bar{y}$, $\bar{z}$, $V(\lambda)$, and $V'(\lambda)$ (cont.)

λ (nm)	$\bar{x}$	$\bar{y}$, V	$\bar{z}$	V'
685	0.032900	0.011920	0.000000	0.000050
690	0.022700	0.008210	0.000000	0.000035
695	0.015840	0.005723	0.000000	0.000025
700	0.011359	0.004102	0.000000	0.000018
705	0.008111	0.002929	0.000000	0.000013
710	0.005790	0.002091	0.000000	0.000009
715	0.004106	0.001484	0.000000	0.000007
720	0.002899	0.001047	0.000000	0.000005
725	0.002049	0.000740	0.000000	0.000003
730	0.001440	0.000520	0.000000	0.000003
735	0.001000	0.000361	0.000000	0.000002
740	0.000690	0.000249	0.000000	0.000001
745	0.000476	0.000172	0.000000	0.000001
750	0.000332	0.000120	0.000000	0.000001
755	0.000235	0.000085	0.000000	0.000001
760	0.000166	0.000060	0.000000	0.000000
765	0.000117	0.000042	0.000000	0.000000
770	0.000083	0.000030	0.000000	0.000000
775	0.000059	0.000021	0.000000	0.000000
780	0.000042	0.000015	0.000000	0.000000
785	0.000029	0.000011	0.000000	0.000000
790	0.000021	0.000007	0.000000	0.000000
795	0.000015	0.000005	0.000000	0.000000
800	0.000010	0.000004	0.000000	0.000000
805	0.000007	0.000003	0.000000	0.000000
810	0.000005	0.000002	0.000000	0.000000
815	0.000004	0.000001	0.000000	0.000000
820	0.000003	0.000001	0.000000	0.000000
825	0.000002	0.000001	0.000000	0.000000
830	0.000001	0.000000	0.000000	0.000000

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Archaic and Arcane Units of Illumination

Luminous Intensity

The unit of luminous intensity is, and has been, the base unit of photometry. Until recently, it suffered from a lack of stable, reproducible standards. Over the past century and a half, standards have ranged from actual candles (wax or whale fat), gas lamps (pentane, isopropyl acetate), vegetable oil lamps (colza, i.e. canola oil), carbon filament lamps, blackbody furnaces, and finally, in 1979, a radiometric standard. Because of the past difficulty in realizing the standard, most of these expressions for intensity are approximate at best.

1 Hefner candle ≈ 0.9 cd
1 candlepower* = 1 candela (cd)
1 new candle = 1 bougie nouvelle = 1 cd
1 candle (UK) ≈ 1 cd
1 decimal candle = 1 bougie decimal = 1.02 cd
1 international candle = 1.02 cd
1 Vereinskerze (German candle) ≈ 1.1 cd
1 pentane candle ≈ 10 cd
1 Munich candle ≈ 1.2 cd
1 carcel unit ≈ 9.8 cd
1 Violle ≈ 20.4 cd

Luminous Flux

1 spherical candlepower* (SCP) = 4π lumens (lm)
1 mean spherical candlepower* (MSCP) = 4π lm

Illuminance

1 nox = 0.001 lux
1 milliphot = 10 lux
1 footcandle* = 1 lm/ft^2 = 10.764 lux
1 flame = 43.06 lux
1 cm-candle = 1 phot = 10,000 lux

* still in occasional use

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Archaic and Arcane Units of Illumination (cont.)

Luminance

Several units of luminance have the number π in the denominator. This was done before the availability of calculators and computers to facilitate the calculation of the luminance of a **Lambertian** surface, which radiates uniform **luminance** over a projected solid angle of π steradians. For example, a Lambertian surface with **reflectance**, ρ, receiving an **illuminance** of *x* lux has a **luminance** of ρ*x* apostilbs.

1 bril = 3.183×10^{-8} nit
1 skot = 3.183×10^{-4} nit
1 apostilb = 1 Blondel = 1 cd/πm^2 = 0.3183 nit
1 millilambert = 3.183 nit
1 foot-Lambert* = 1 cd/πft^2 = 3.426 cd/m^2 = 3.426 nit
1 cd/ft2 = 10.76 nit
1 Lambert = 1 cd/πcm^2 = 3183 nit
1 stilb = 1 cd/cm^2 = 10,000 nit

CCT

1 mired* (microreciprocal degree) = 1 reciprocal megaKelvin $(MK)^{-1}$
1 mirek* (microreciprocal Kelvin) = 1 reciprocal megaKelvin $(MK)^{-1}$

Photons

1 Einstein† = Avagadro's number of photons
1 Einstein† = 6.022×10^{23} photons
1 micromole† = 6.022×10^{17} photons in the 400- to 700-nm band

Photon Radiance

1 Rayleigh† = 7.96×10^{-8} photons/sec·m^2·sr

Wavelength

1 millimicron* = 1 nanometer

* still in occasional use
† still in occasional use in fields other than illumination or optics

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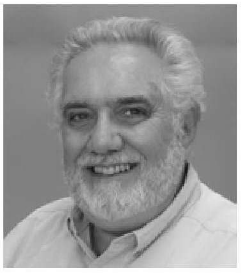

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