

Lightsource Test Report

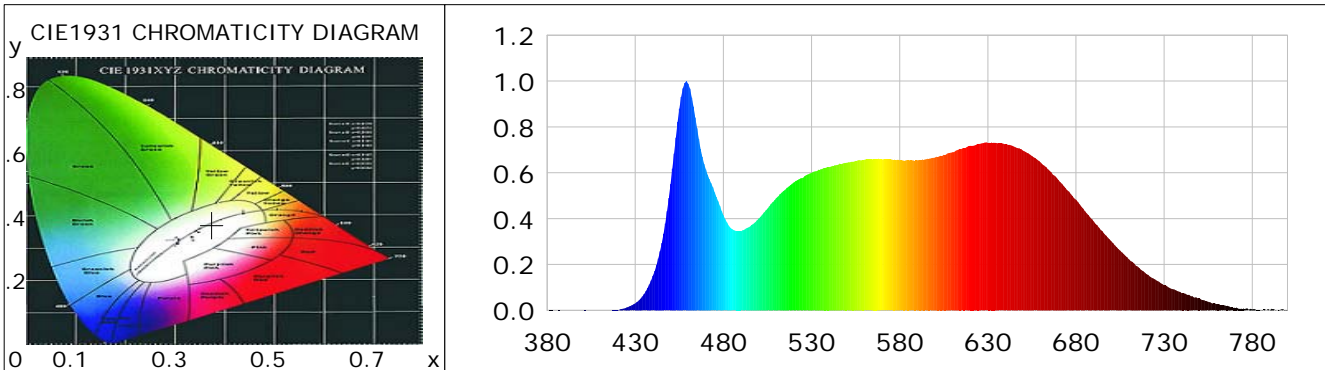
Product Information

Product Category: LED-Röhre
 Product Spec: LEDtube-120-8Veg-20WM
 Manufacturer: METOLIGHT
 Buyer: 7116

Product Type: LED-Röhre-Spezial
 Product Number: 1
 Submitted Unit: 105182

CIE Colorimetric Parameters

Chromaticity coordinates: $x=0.3742$ $y=0.3731$ $u(u')=0.2225$ $v=0.3327$ $v'=0.4990$
 CCT: $T_c=4148K$ ($duv=0.00013$) Color Ratio: $R=0.197$ $G=0.755$ $B=0.048$
 Peak Wavelength: 458.9nm Half Bandwidth: 26.6nm
 Dominant Wavelength: 578.4nm Color Purity: 0.243
 CRI: $R_a=95.3$, $avgR(1\sim14)=93.5$, $avgR(1\sim15)=93.6$ TM30: $R_f=88$, $R_g=96$
 GAI: $GAI_BB_8=97.0$, $GAI_BB_15=104.0$, $GAI_EES=78.7$
 R1 =97 R2 =100 R3 =98 R4 =91 R5 =93 R6 =96 R7 =93 R8 =93
 R9 =94 R10=97 R11=92 R12=66 R13=99 R14=98 R15=95
 Color Quality Scale: $Q_a=91.8$, $Q_f=91.5$, $Q_p=91.6$, $Q_g=97.6$
 Q1 =88 Q2 =96 Q3 =90 Q4 =84 Q5 =85 Q6 =87 Q7 =95 Q8 =97
 Q9 =98 Q10=98 Q11=97 Q12=98 Q13=99 Q14=97 Q15=94



Photometric Parameters

Luminous Flux: 1785.5 lm Efficiency: 88.74 lm/W Radiant Power: 6.413 W
 Total mains efficacy: 104.36 lm/W Energy Efficiency Class: F (EU 2019/2015)
 Pupil Flux: 2932.03 Plm Pupil Lumens Per Watt: 145.73 Plm/W Pupil Factor (Kp): 1.642
 Circopic Flux: 6330.13 lm

Electric Parameters

Voltage: 230.60V Current: 0.0910A Power: 20.12W
 Power Factor: 0.9580 Frequency: 49.99Hz

Test Information

Scan Range: 380~800:1nm Photometric Method: sphere-spectroradiometer
 Stabilization Time: 0 ms ALC.: 1.0000 Photometric Condition: Sphere diameter: 2.00m, 4PI
 Max of Signal: 49476 (2263) CCD Integration Time: 200.21 ms

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| WL(nm) | PL | PE(mW/nm) | WL(nm) | PL | PE(mW/nm) | WL(nm) | PL | PE(mW/nm) |
|--------|--------|-----------|--------|--------|-----------|--------|--------|-----------|
| 380 | 0.0001 | 0.0053 | 525 | 0.5773 | 22.6921 | 670 | 0.5694 | 22.3812 |
| 385 | 0.0004 | 0.0176 | 530 | 0.6003 | 23.5942 | 675 | 0.5238 | 20.5865 |
| 390 | 0.0006 | 0.0241 | 535 | 0.6145 | 24.1533 | 680 | 0.4830 | 18.9839 |
| 395 | 0.0004 | 0.0161 | 540 | 0.6253 | 24.5785 | 685 | 0.4322 | 16.9858 |
| 400 | 0.0006 | 0.0229 | 545 | 0.6347 | 24.9481 | 690 | 0.3876 | 15.2354 |
| 405 | 0.0001 | 0.0027 | 550 | 0.6443 | 25.3239 | 695 | 0.3446 | 13.5453 |
| 410 | 0.0003 | 0.0119 | 555 | 0.6518 | 25.6197 | 700 | 0.3014 | 11.8478 |
| 415 | 0.0010 | 0.0383 | 560 | 0.6568 | 25.8163 | 705 | 0.2605 | 10.2392 |
| 420 | 0.0027 | 0.1050 | 565 | 0.6602 | 25.9471 | 710 | 0.2227 | 8.7520 |
| 425 | 0.0121 | 0.4737 | 570 | 0.6583 | 25.8730 | 715 | 0.1908 | 7.5002 |
| 430 | 0.0305 | 1.2006 | 575 | 0.6584 | 25.8778 | 720 | 0.1578 | 6.2041 |
| 435 | 0.0711 | 2.7931 | 580 | 0.6544 | 25.7196 | 725 | 0.1341 | 5.2721 |
| 440 | 0.1502 | 5.9030 | 585 | 0.6558 | 25.7772 | 730 | 0.1091 | 4.2863 |
| 445 | 0.2934 | 11.5327 | 590 | 0.6544 | 25.7217 | 735 | 0.0928 | 3.6483 |
| 450 | 0.5508 | 21.6485 | 595 | 0.6591 | 25.9061 | 740 | 0.0750 | 2.9467 |
| 455 | 0.8798 | 34.5785 | 600 | 0.6672 | 26.2218 | 745 | 0.0627 | 2.4638 |
| 460 | 0.9880 | 38.8338 | 605 | 0.6784 | 26.6619 | 750 | 0.0529 | 2.0778 |
| 465 | 0.7945 | 31.2270 | 610 | 0.6894 | 27.0943 | 755 | 0.0376 | 1.4783 |
| 470 | 0.6144 | 24.1475 | 615 | 0.7043 | 27.6808 | 760 | 0.0269 | 1.0563 |
| 475 | 0.5147 | 20.2299 | 620 | 0.7183 | 28.2312 | 765 | 0.0199 | 0.7819 |
| 480 | 0.4150 | 16.3115 | 625 | 0.7261 | 28.5398 | 770 | 0.0116 | 0.4549 |
| 485 | 0.3542 | 13.9221 | 630 | 0.7304 | 28.7059 | 775 | 0.0079 | 0.3106 |
| 490 | 0.3454 | 13.5774 | 635 | 0.7295 | 28.6730 | 780 | 0.0049 | 0.1917 |
| 495 | 0.3650 | 14.3474 | 640 | 0.7244 | 28.4707 | 785 | 0.0014 | 0.0546 |
| 500 | 0.4001 | 15.7238 | 645 | 0.7137 | 28.0515 | 790 | 0.0020 | 0.0780 |
| 505 | 0.4439 | 17.4463 | 650 | 0.6963 | 27.3657 | 795 | 0.0018 | 0.0699 |
| 510 | 0.4904 | 19.2762 | 655 | 0.6730 | 26.4525 | 800 | 0.0029 | 0.1142 |
| 515 | 0.5260 | 20.6752 | 660 | 0.6447 | 25.3398 | | | |
| 520 | 0.5583 | 21.9442 | 665 | 0.6093 | 23.9490 | | | |

Condition: Tx: 17.8°C, Ti: 0.0°C, R.H.: 60%
 Test Lab:
 Operator: CRE

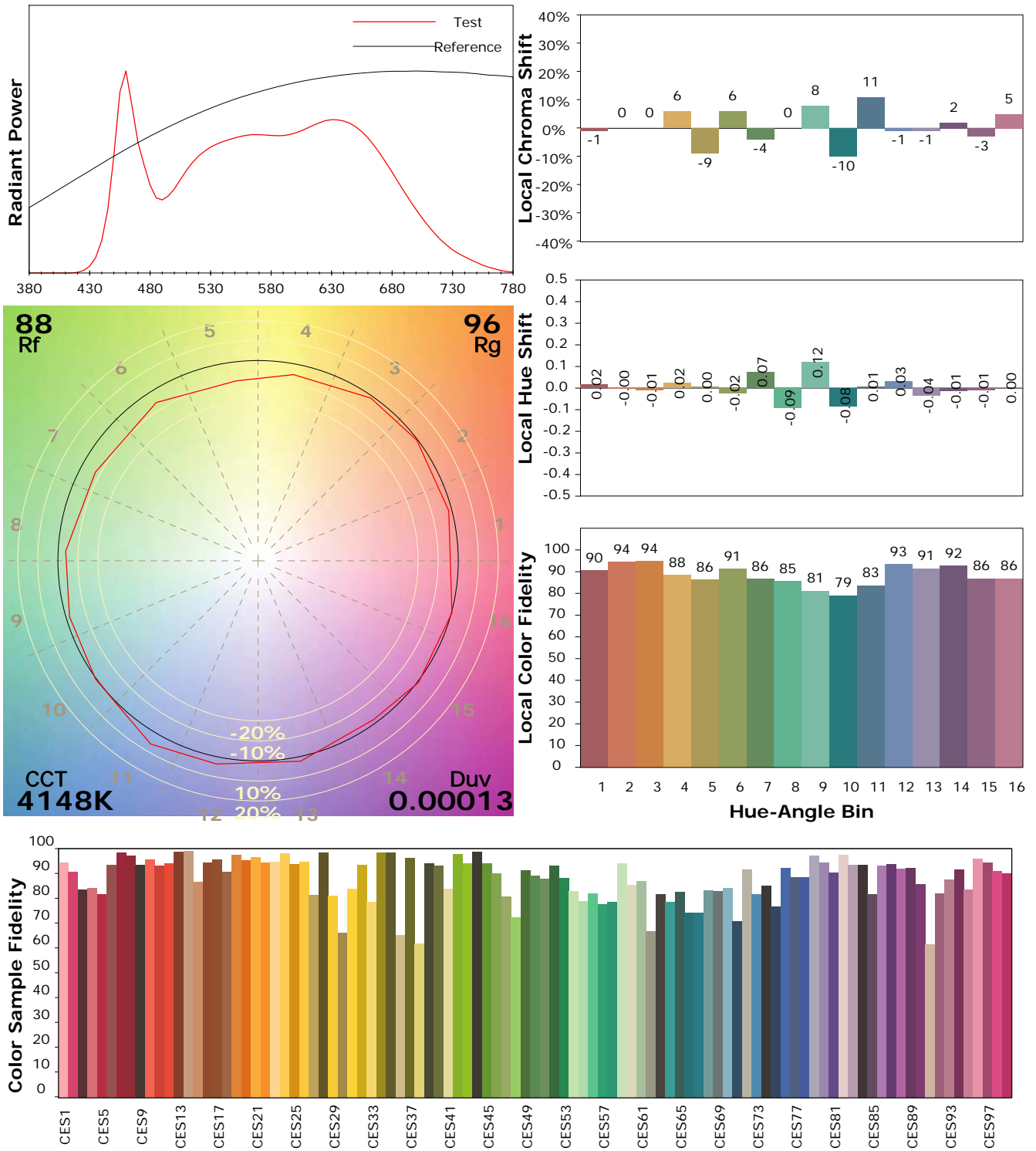
Test Device: Lisun LMS-9000B
 Test Time: 2021-01-18 14:41:52
 Inspector:

I ES TM-30-18 Color Rendition Report

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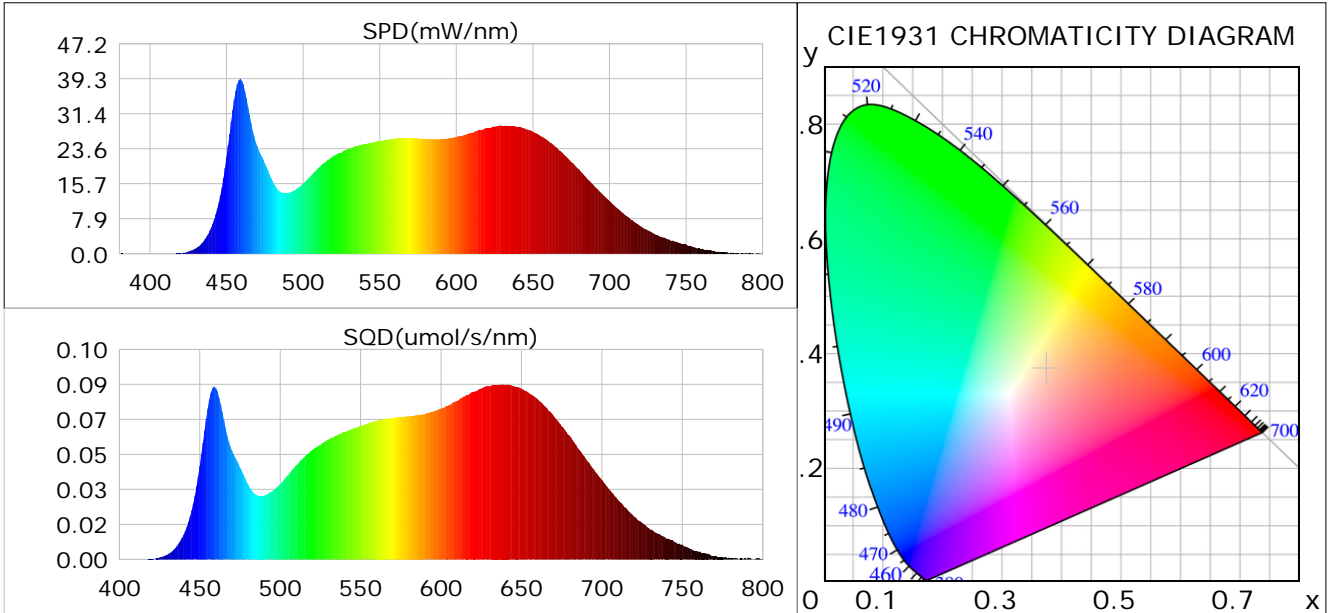
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Plant optical param data

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 CRI: $R_a=95.3$



Plant Optical Param

| | |
|----------------------------------|-------------------------------|
| $ \mu_v(lm): 1785.50$ | $Q_v(lm.s): 1785.50$ |
| $ \mu_e, \dot{E}(W/nm): 6.41$ | $Q_e(J): 6.41$ |
| $ \mu_e(W): 6.10$ | $ \mu_{fr}(W): 0.33$ |
| $ \zeta_e: 0.30$ | $ \zeta_{fr}: 0.02$ |
| $PPE(umol/s/w): 1.45$ | $K_{fr}: 0.09$ |
| $Erb_Ratio: 1.85$ | $PPF(umol/s): 29.13$ |
| $PF_{uv}(360-400)(umol/s): 0.00$ | $PPF(400-500)(umol/s): 5.08$ |
| $PPF(500-600)(umol/s): 11.08$ | $PPF(600-700)(umol/s): 12.97$ |
| $PPF_r(700-800)(umol/s): 1.90$ | $PPF.t(umol): 29.13$ |
| $ \mu_{ch-A.t}(J): 0.51$ | $ \mu_{ch-A}(W): 0.51$ |
| $ \mu_{ch-B.t}(J): 0.30$ | $ \mu_{ch-B}(W): 0.30$ |
| $ \mu_b.t(J): 1.30$ | $ \mu_b(W): 1.30$ |
| $ \mu_y.t(J): 2.41$ | $ \mu_y(W): 2.41$ |
| $ \mu_r.t(J): 2.43$ | $ \mu_r(W): 2.43$ |

Electric Parameters

| | | |
|----------------------|--------------------|---------------|
| Voltage: 230.60V | Current: 0.0910A | Power: 20.12W |
| Power Factor: 0.9580 | Frequency: 49.99Hz | |

Condition: $T_x: 17.8^\circ C$, $T_i: 0.0^\circ C$, R.H.: 60%
 Test Lab:
 Operator: CRE

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