

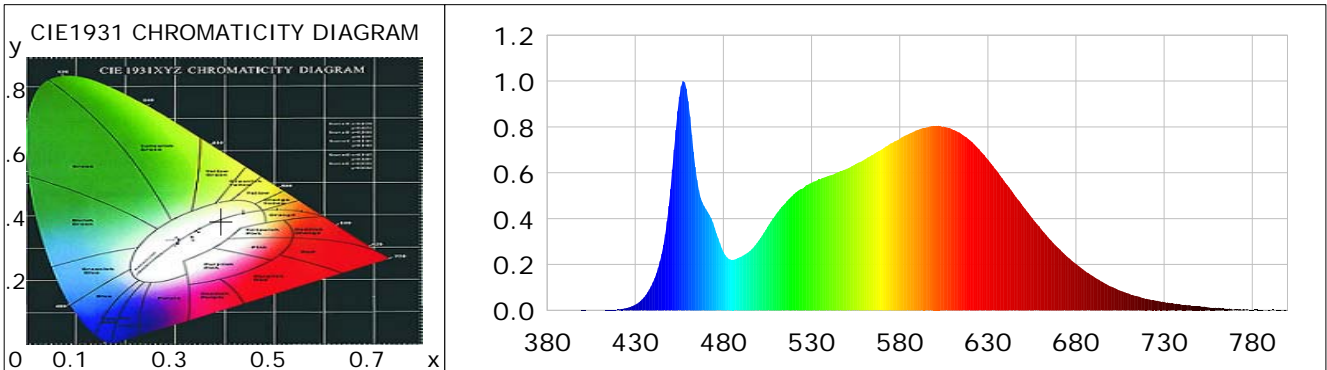
Lightsource Test Report

Product Information

Product Category: LED-Röhre
 Product Spec: LEDtube-120-10NWM-24W-2120-230
 Manufacturer: METOLIGHT
 Buyer: 4624
 Product Type: LED-Röhre-Spezial
 Product Number: 1
 Submitted Unit: 101735

CIE Colorimetric Parameters

Chromaticity coordinates: $x=0.3929$ $y=0.3849$ $u(u')=0.2300$ $v=0.3380$ $v'=0.5070$
 CCT: $T_c=3741K$ ($duv=0.00034$) Color Ratio: $R=0.197$ $G=0.767$ $B=0.036$
 Peak Wavelength: 457.3nm Half Bandwidth: 17.1nm
 Dominant Wavelength: 579.9nm Color Purity: 0.334
 CRI: $R_a=84.9$, $avgR(1\sim14)=78.8$, $avgR(1\sim15)=78.8$ TM30: $R_f=83$, $R_g=93$
 GAI: $GAI_BB_8=91.3$, $GAI_BB_15=100.6$, $GAI_EES=67.9$
 R1 =84 R2 =93 R3 =96 R4 =82 R5 =83 R6 =89 R7 =85 R8 =67
 R9 =20 R10=81 R11=80 R12=58 R13=87 R14=98 R15=79
 Color Quality Scale: $Q_a=83.6$, $Q_f=83.9$, $Q_p=82.8$, $Q_g=92.0$
 Q1 =81 Q2 =96 Q3 =81 Q4 =75 Q5 =79 Q6 =81 Q7 =86 Q8 =89
 Q9 =98 Q10=92 Q11=88 Q12=87 Q13=86 Q14=77 Q15=79



Photometric Parameters

Luminous Flux: 3213.5 lm Efficiency: 133.73 lm/W Radiant Power: 9.717 W
 Total mains efficacy: 133.73 lm/W Energy Efficiency Class: E (EU 2019/2015)
 Pupil Flux: 4736.40 Plm Pupil Lumens Per Watt: 197.10 Plm/W Pupil Factor (Kp): 1.474
 Circopic Flux: 9587.63 lm

Electric Parameters

Voltage: 230.70V Current: 0.1100A Power: 24.03W
 Power Factor: 0.9400 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: 53204 (2284) CCD Integration Time: 110.08 ms

Condition: Tx: 18.6°C, Ti: 0.0°C, R.H.: 60%
 Test Lab:
 Operator: CRE

Test Device: Lisun LMS-9000B
 Test Time: 2021-01-18 15:14:01
 Inspector:

Lightsource Test Report

Product Information

Product Category: LED-Röhre
 Product Spec: LEDtube-120-10NWM-24W-2120-230
 Manufacturer: METOLIGHT
 Buyer: 4624

Product Type: LED-Röhre-Spezial
 Product Number: 1
 Submitted Unit: 101735

WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0005	0.0389	525	0.5317	37.6859	670	0.2719	19.2705
385	0.0005	0.0375	530	0.5561	39.4127	675	0.2342	16.6008
390	0.0005	0.0363	535	0.5717	40.5196	680	0.2025	14.3518
395	0.0003	0.0182	540	0.5874	41.6330	685	0.1723	12.2082
400	0.0008	0.0566	545	0.6021	42.6738	690	0.1466	10.3919
405	0.0001	0.0093	550	0.6177	43.7794	695	0.1240	8.7906
410	0.0006	0.0424	555	0.6378	45.2053	700	0.1034	7.3257
415	0.0013	0.0949	560	0.6572	46.5790	705	0.0861	6.1048
420	0.0036	0.2543	565	0.6795	48.1618	710	0.0726	5.1465
425	0.0104	0.7371	570	0.7029	49.8206	715	0.0610	4.3228
430	0.0246	1.7405	575	0.7284	51.6251	720	0.0506	3.5850
435	0.0566	4.0110	580	0.7484	53.0419	725	0.0429	3.0384
440	0.1217	8.6247	585	0.7682	54.4426	730	0.0363	2.5761
445	0.2469	17.4963	590	0.7868	55.7626	735	0.0306	2.1692
450	0.5285	37.4538	595	0.7979	56.5492	740	0.0241	1.7103
455	0.9306	65.9585	600	0.8040	56.9834	745	0.0212	1.5054
460	0.9121	64.6444	605	0.8018	56.8302	750	0.0194	1.3757
465	0.5686	40.3024	610	0.7888	55.9060	755	0.0132	0.9372
470	0.4422	31.3419	615	0.7700	54.5707	760	0.0100	0.7062
475	0.3596	25.4887	620	0.7414	52.5430	765	0.0077	0.5430
480	0.2549	18.0639	625	0.7029	49.8166	770	0.0054	0.3807
485	0.2202	15.6089	630	0.6574	46.5905	775	0.0058	0.4083
490	0.2337	16.5635	635	0.6092	43.1747	780	0.0029	0.2082
495	0.2588	18.3426	640	0.5556	39.3766	785	0.0033	0.2312
500	0.3039	21.5424	645	0.5044	35.7504	790	0.0017	0.1210
505	0.3639	25.7920	650	0.4525	32.0730	795	0.0009	0.0634
510	0.4214	29.8633	655	0.4037	28.6097	800	0.0035	0.2474
515	0.4662	33.0417	660	0.3565	25.2686			
520	0.5074	35.9616	665	0.3110	22.0420			

Condition: Tx: 18.6°C, Ti: 0.0°C, R.H.: 60%
 Test Lab:
 Operator: CRE

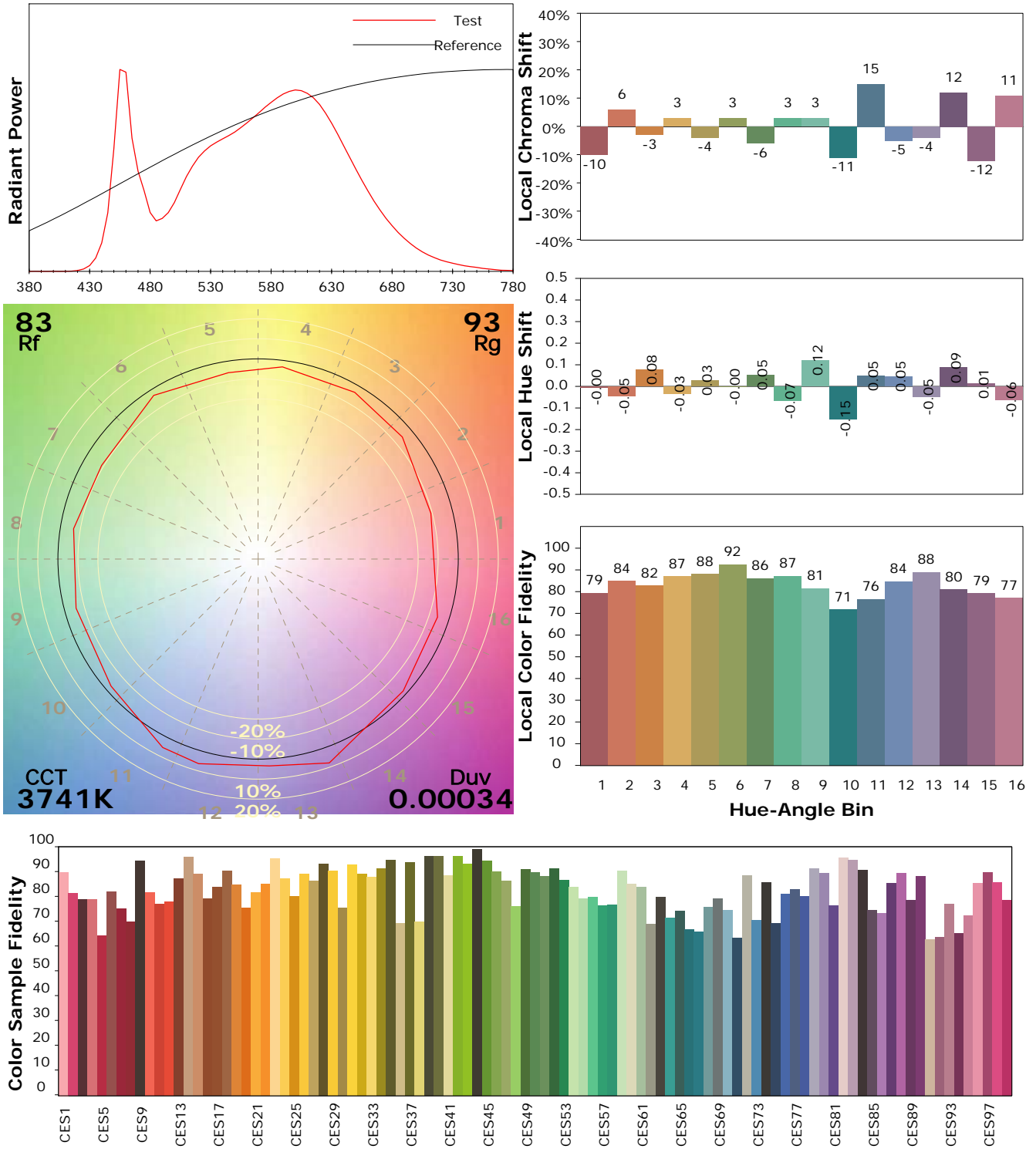
Test Device: Lisun LMS-9000B
 Test Time: 2021-01-18 15:14:01
 Inspector:

IES TM-30-18 Color Rendition Report

Product Information

Product Category: LED-Röhre
 Product Spec: LEDtube-120-10NWM-24W-2120-230
 Manufacturer: METOLIGHT
 Buyer: 4624

Product Type: LED-Röhre-Spezial
 Product Number: 1
 Submitted Unit: 101735



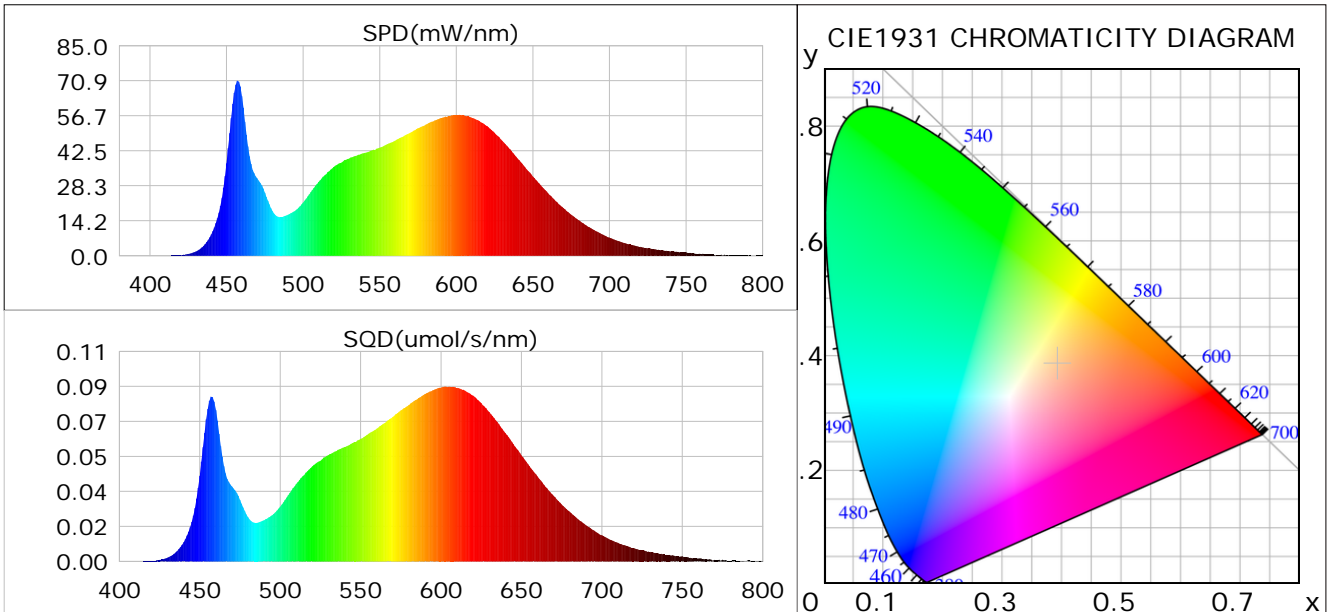
Condition: Tx: 18.6°C, Ti: 0.0°C, R.H.: 60%
 Test Lab:
 Operator: CRE

Test Device: Lisun LMS-9000B
 Test Time: 2021-01-18 15:14:01
 Inspector:

Plant optical param data

CIE Colorimetric Parameters

Chromaticity coordinates: $x=0.3929$ $y=0.3849$ $u(u')=0.2300$ $v=0.3380$ $v'=0.5070$
 CCT: $T_c=3741K$ ($duv=0.00034$) Color Ratio: $R=0.197$ $G=0.767$ $B=0.036$
 Peak Wavelength: 457.3nm Half Bandwidth: 17.1nm
 Dominant Wavelength: 579.9nm Color Purity: 0.334
 CRI: $R_a=84.9$



Plant Optical Param

$ \mu_v(lm): 3213.50$	$Q_v(lm.s): 3213.50$
$ \mu_e, \dot{E}(W/nm): 9.72$	$Q_e(J): 9.72$
$ \mu_e(W): 9.53$	$ \mu_{fr}(W): 0.20$
$ \zeta_e: 0.40$	$ \zeta_{fr}: 0.01$
$PPE(umol/s/w): 1.87$	$K_{fr}: 0.05$
$Erb_Ratio: 1.72$	$PPF(umol/s): 45.04$
$PF_{uv}(360-400)(umol/s): 0.00$	$PPF(400-500)(umol/s): 7.38$
$PPF(500-600)(umol/s): 20.35$	$PPF(600-700)(umol/s): 17.31$
$PPF_{fr}(700-800)(umol/s): 1.15$	$PPF.t(umol): 45.04$
$ \mu_{ch-A.t}(J): 0.71$	$ \mu_{ch-A}(W): 0.71$
$ \mu_{ch-B.t}(J): 0.45$	$ \mu_{ch-B}(W): 0.45$
$ \mu_b.t(J): 1.90$	$ \mu_b(W): 1.90$
$ \mu_y.t(J): 4.40$	$ \mu_y(W): 4.40$
$ \mu_r.t(J): 3.31$	$ \mu_r(W): 3.31$

Electric Parameters

Voltage: 230.70V	Current: 0.1100A	Power: 24.03W
Power Factor: 0.9400	Frequency: 49.99Hz	

Condition: $T_x: 18.6^\circ C$, $T_i: 0.0^\circ C$, R.H.: 60%
 Test Lab:
 Operator: CRE

Test Device: Lisun LMS-9000B
 Test Time: 2021-01-18 15:14:01
 Inspector: