

## Lightsource Test Report

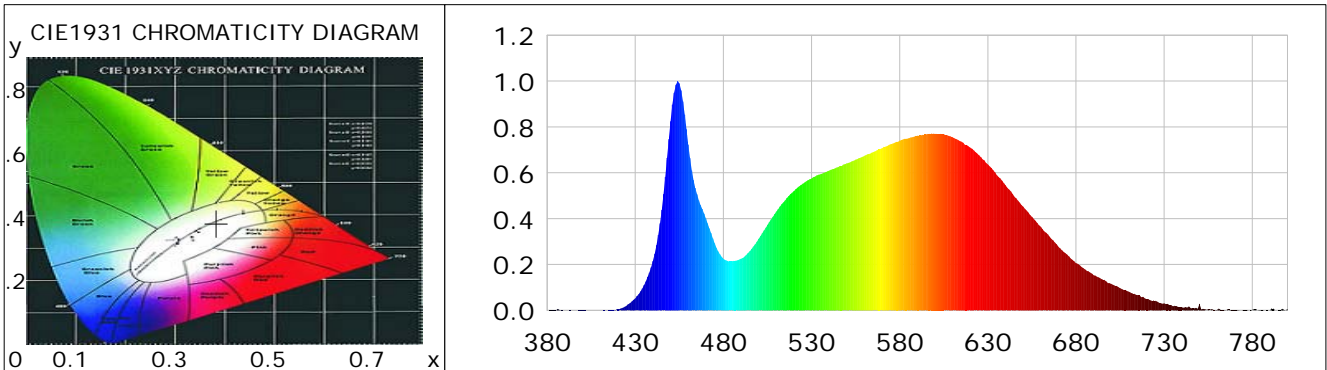
### Product Information

Product Category: LEDtube  
 Product Spec: LEDtube-060-8NWM-09W-ECOP  
 Manufacturer: METOLIGHT  
 Buyer: 4656

Product Type: LED-060-ECOP  
 Product Number: 1  
 Submitted Unit: 104146

### CIE Colorimetric Parameters

Chromaticity coordinates:  $x=0.3834$   $y=0.3782$   $u(u')=0.2265$   $v=0.3351$   $v'=0.5027$   
 CCT:  $T_c=3931K$  ( $duv=-0.00018$ ) Color Ratio:  $R=0.189$   $G=0.776$   $B=0.035$   
 Peak Wavelength: 454.1nm Half Bandwidth: 19.3nm  
 Dominant Wavelength: 579.4nm Color Purity: 0.286  
 CRI:  $R_a=84.6$ ,  $avgR(1\sim14)=78.2$ ,  $avgR(1\sim15)=78.3$  TM30:  $R_f=83$ ,  $R_g=95$   
 GAI:  $GAI\_BB\_8=93.5$ ,  $GAI\_BB\_15=101.8$ ,  $GAI\_EES=72.7$   
 R1 =84 R2 =91 R3 =94 R4 =83 R5 =83 R6 =86 R7 =87 R8 =70  
 R9 =23 R10=76 R11=81 R12=57 R13=86 R14=97 R15=79  
 Color Quality Scale:  $Q_a=83.3$ ,  $Q_f=83.3$ ,  $Q_p=83.5$ ,  $Q_g=93.7$   
 Q1 =84 Q2 =98 Q3 =78 Q4 =74 Q5 =79 Q6 =82 Q7 =86 Q8 =89  
 Q9 =97 Q10=89 Q11=86 Q12=85 Q13=86 Q14=77 Q15=80



### Photometric Parameters

Luminous Flux: 902.42 lm Efficiency: 123.96 lm/W Radiant Power: 2.751 W  
 Total mains efficacy: 145.78 lm/W Energy Efficiency Class: D (EU 2019/2015)  
 Pupil Flux: 1349.75 Plm Pupil Lumens Per Watt: 185.41 Plm/W Pupil Factor (Kp): 1.496  
 Circopic Flux: 2735.06 lm

### Electric Parameters

Voltage: 231.00V Current: 0.0340A Power: 7.28W  
 Power Factor: 0.9080 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: 46643 (2610) CCD Integration Time: 356.82 ms

Condition: Tx:20.8'C, Ti:0.0'C, R.H.:60%  
 Test Lab:  
 Operator: CRE

Test Device: Lisun LMS-9000B  
 Test Time: 2021-01-11 15:00:29  
 Inspector:

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WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0007	0.0135	525	0.5523	10.9773	670	0.2783	5.5304
385	0.0010	0.0196	530	0.5751	11.4293	675	0.2435	4.8392
390	0.0003	0.0068	535	0.5939	11.8030	680	0.2063	4.0996
395	0.0000	0.0008	540	0.6095	12.1136	685	0.1793	3.5636
400	0.0012	0.0236	545	0.6247	12.4163	690	0.1534	3.0482
405	0.0001	0.0011	550	0.6411	12.7422	695	0.1345	2.6740
410	0.0006	0.0117	555	0.6572	13.0616	700	0.1156	2.2970
415	0.0019	0.0369	560	0.6738	13.3906	705	0.0970	1.9277
420	0.0049	0.0983	565	0.6905	13.7237	710	0.0813	1.6155
425	0.0198	0.3931	570	0.7072	14.0557	715	0.0669	1.3293
430	0.0523	1.0398	575	0.7248	14.4049	720	0.0482	0.9588
435	0.1097	2.1811	580	0.7401	14.7091	725	0.0413	0.8207
440	0.2146	4.2645	585	0.7502	14.9095	730	0.0302	0.5999
445	0.4390	8.7257	590	0.7617	15.1376	735	0.0179	0.3554
450	0.8245	16.3855	595	0.7677	15.2567	740	0.0138	0.2744
455	0.9899	19.6742	600	0.7706	15.3154	745	0.0098	0.1957
460	0.7233	14.3743	605	0.7684	15.2713	750	0.0283	0.5633
465	0.5062	10.0602	610	0.7547	14.9986	755	0.0045	0.0904
470	0.4012	7.9730	615	0.7361	14.6299	760	0.0029	0.0585
475	0.2931	5.8246	620	0.7100	14.1098	765	0.0007	0.0140
480	0.2253	4.4785	625	0.6763	13.4415	770	0.0018	0.0349
485	0.2145	4.2635	630	0.6362	12.6443	775	0.0035	0.0690
490	0.2250	4.4721	635	0.5903	11.7309	780	0.0028	0.0564
495	0.2580	5.1276	640	0.5459	10.8488	785	0.0017	0.0343
500	0.3121	6.2033	645	0.4967	9.8717	790	0.0006	0.0127
505	0.3728	7.4090	650	0.4526	8.9956	795	0.0020	0.0402
510	0.4312	8.5707	655	0.4083	8.1140	800	0.0076	0.1515
515	0.4797	9.5328	660	0.3644	7.2422			
520	0.5203	10.3407	665	0.3216	6.3922			

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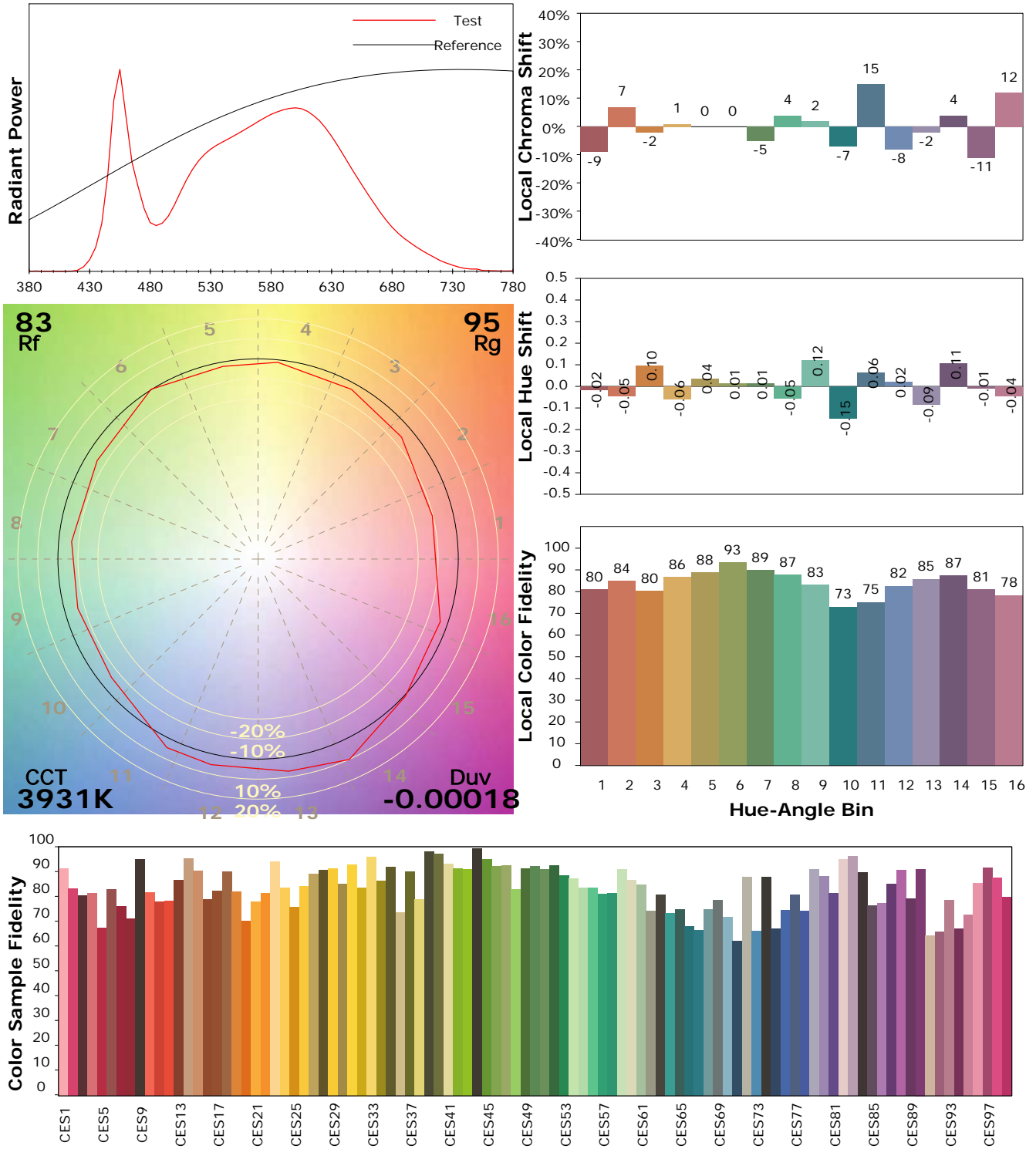
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## I ES TM-30-18 Color Rendition Report

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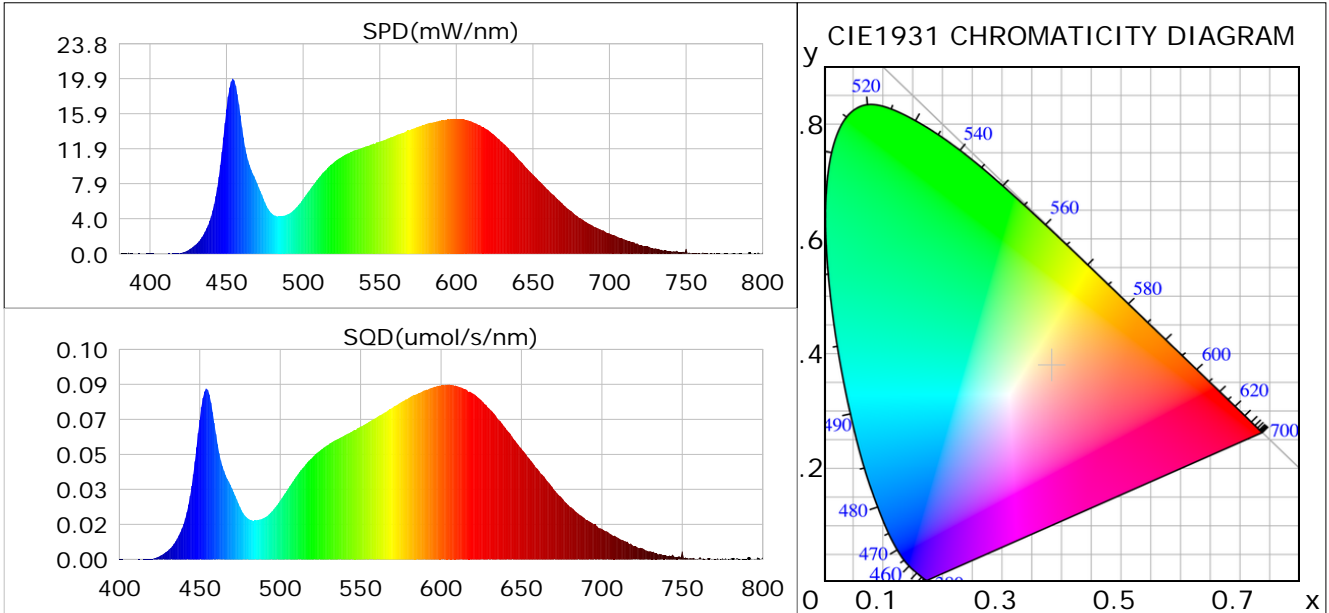
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## Plant optical param data

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 Dominant Wavelength: 579.4nm Color Purity: 0.286  
 CRI:  $R_a=84.6$



### Plant Optical Param

$ \mu_v(lm): 902.42$	$Q_v(lm.s): 902.42$
$ \mu_e, \dot{E}(W/nm): 2.75$	$Q_e(J): 2.75$
$ \mu_e(W): 2.70$	$ \mu_{fr}(W): 0.05$
$ \dot{C}_e: 0.37$	$ \dot{C}_{fr}: 0.01$
$PPE(umol/s/w): 1.75$	$K_{fr}: 0.04$
$Erb\_Ratio: 1.59$	$PPF(umol/s): 12.72$
$PF_{uv}(360-400)(umol/s): 0.00$	$PPF(400-500)(umol/s): 2.19$
$PPF(500-600)(umol/s): 5.76$	$PPF(600-700)(umol/s): 4.78$
$PPF_{fr}(700-800)(umol/s): 0.29$	$PPF.t(umol): 12.72$
$ \mu_{ch-A.t}(J): 0.21$	$ \mu_{ch-A}(W): 0.21$
$ \mu_{ch-B.t}(J): 0.13$	$ \mu_{ch-B}(W): 0.13$
$ \mu_b.t(J): 0.57$	$ \mu_b(W): 0.57$
$ \mu_y.t(J): 1.25$	$ \mu_y(W): 1.25$
$ \mu_r.t(J): 0.91$	$ \mu_r(W): 0.91$

### Electric Parameters

Voltage: 231.00V	Current: 0.0340A	Power: 7.28W
Power Factor: 0.9080	Frequency: 49.99Hz	

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