Ningbo TengLi Testing Co., Ltd

2nd floor, Block B, Ningbo Testing and Certification Base, No. 66
Qingyi Road, Ningbo National Hi-Tech Zone, Ningbo, Zhejiang
Tel: 86574-8783 6802
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ACCREDITED
Certificate#4703.02

LM-79-08 Test Report

For

Suzhou RUNLUX Electric Ltd

(Brand Name: RUNLUX)

No. 9 Dongtinghu Road,Kunshan Economic & Technological Development Zone,
KUNSHAN CITY Jiangsu China

Model name(s): R5-4VTA60WDHV13P#zL-3CK

Report Type:	Testing and Report According to IES LM-79-2008
Type of Luminaire:	Application1: Direct Linear Ambient Luminaires Application2: Low Bay Luminaires (Commercial and Industrial) Application3: Stairwell and Passageway Luminaires
Report Date:	2022-08-15
Prepared By:	Ningbo TengLi Testing Co., Ltd 2nd floor, Block B, Ningbo Testing and Certification Base, No. 66 Qingyi Road, Ningbo National Hi-Tech Zone, Ningbo, Zhejiang

Test & Report By:

Nick Song

Engineer: Nick Song

Review By:

Garman Mo

Manager: Garman Mo

Note: 1. The results contained in this report pertain only to the tested samples

2. This report does not imply product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

1.1 Product Information:		
Model Number	R5-4VTA60WDHV13P#zL-3CK	
Remark	"#z" may be any alphanumerical character or Blank denotes the series number. The "#" denotes sensor, #=B denotes sensor B; #=C denotes sensor C; Blank denotes no sensor Employed. The "z" denotes default Input Wattage， z=T denotes default Input Wattage is 30W; z=S denotes default Input Wattage is 45W; Blank denotes default Input Wattage is 60W.	
Representative (Tested) Model	R5-4VTA60WDHV13PL-3CK	
Model Difference	N/A	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Application1: Direct Linear Ambient Luminaires Application2: Low Bay Luminaires (Commercial and Industrial) Application3: Stairwell and Passageway Luminaires	
LED Manufacturer	Seoul Semiconductor Co., LTD	
LED Model	STW8A2PD-B2	
Dimming	Continuous	
Integral Controls	Yes	
Sample Number	STD220813NB-D1	
Date of Receipt	Aug 07,2022	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

1.2 Rated Values:	
Rated Voltage / Frequency	120-347Vac, 50/60Hz
Nominal Power	30W/45W/60W (Power Adjustable)
Rated Initial Lamp Lumen	--
Declared CCT	3500K,4000K,5000K (Color Tunable)

1.3 Test Specifications:

Test item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2015 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source

1.4 Test Methods

1) Photometric and Light Distribution Measurement – Goniophotometer Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at 25°C ± 1°C, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals.

2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º C. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.

3) Electrical Measurements:

Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at 25º C ± 1º C. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.

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2.1 Summary of Test Result

Criteria Item	Measured Value		Compliance	Requirement (DLC V5.1)	
Minimum Total Luminous	7641.3		Pass	Direct Linear Ambient:>=375 lm/ft (-10%) Stairwell and Passageway:>=750(-10%) Low Bay: 5000-10000(±10%)	
Minimum Luminous Efficacy	129.74		Pass	Standard: >= 115(-3%)	Premium: >= 130(-3%)
Minimum Power Factor	0.9622		Pass	>= 0.9(-3%)	
Maximum THD %	15.77		Pass	<= 20(+5)	
Minimum CRI	83.5		Pass	>= 80(-1)	
Minimum R9	7		Pass	>= 0(-1)	
Minimum Rg	96		Pass	>= 89(-1)	
Minimum Rf	84		Pass	>= 70(-1)	
Rcs, h1	-12		Pass	-12%-23%(-1%)	
CCT (K)	3500K	3451	Pass	<=6500K	
	4000K	4188			
	5000K	5037			
Direct Linear Ambient: Zonal Lumen Requirement	0-60°:	81.6	Pass	>= 40(-3)	
Low Bay: Zonal Lumen Requirement	20-50°	52.8	Pass	>=30(-10)	
Stairwell and Passageway: Zonal Lumen Requirement	0-90°	97.8	Pass	>=85(-3)	
Low Bay: UGR	23.5		Pass	<25	
BUG	B3-U3-G1		Pass	--	

2.2 Electrical, Photometric and Chromaticity Measurements

Test date	2022-08-09	Test Ambient:	25±1 °C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	R5-4VTA60WDHV13PL-3CK (0%,3500K)	Total Operating Time(min)	75

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD220813 NB-D1	120.0	60.01	0.4972	59.44	0.9963	6.76
	346.9	60.01	0.1765	58.90	0.9622	15.77

Photometric Measurement – Goniophotometer Method(Tset Dstance: 26.00m):

Parameter	Result	
Test Voltage (V)	120	347
Frequency (Hz)	60	60
Total Luminous (lm)	7821.8	7641.3
Luminous Efficacy (lm/W)	131.59	129.74
Zonal lumens in the 0-60° zone (%)	81.6	--
Zonal lumens in the 20-50° zone (%)	52.8	--
Zonal lumens in the 0-90° zone (%)	97.8	--
Beam Angle (°)	88.4	--
Center Beam Candle Power (cd)	3507	--
UGR Viewed Crosswise	23.2	--
UGR Viewed Endwise	23.5	--
BUG	B3-U3-G1	--

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Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	2,631.2	33.6%
0-40	4,107.4	52.5%
0-60	6,380.1	81.6%
60-90	1,265.5	16.2%
70-100	691.2	8.8%
90-120	151.7	1.9%
0-90	7,645.6	97.8%
90-180	175.9	2.2%
0-180	7,821.5	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	%Total
0-10	332.5	4.3%	90-100	97.5	1.2%
10-20	938.4	12.0%	100-110	27.2	0.3%
20-30	1,360.3	17.4%	110-120	27.0	0.3%
30-40	1,476.2	18.9%	120-130	11.0	0.1%
40-50	1,293.7	16.5%	130-140	5.2	0.1%
50-60	979.0	12.5%	140-150	3.6	0%
60-70	671.8	8.6%	150-160	2.4	0%
70-80	398.0	5.1%	160-170	1.6	0%
80-90	195.7	2.5%	170-180	0.6	0%

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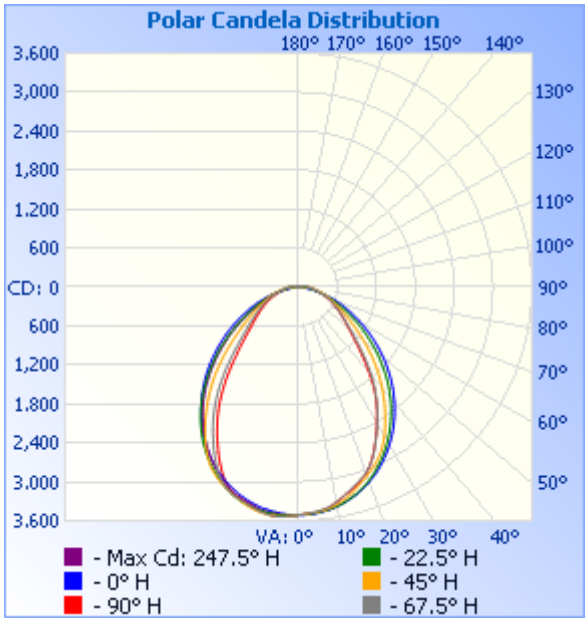
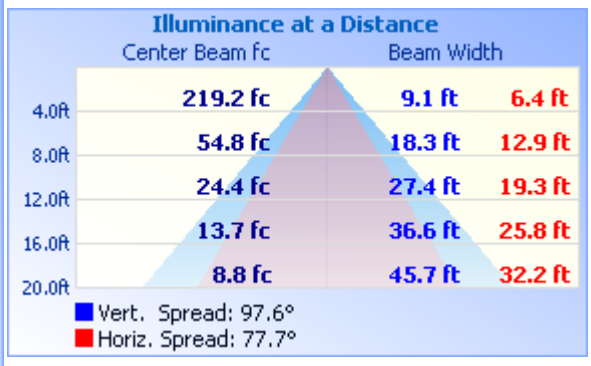
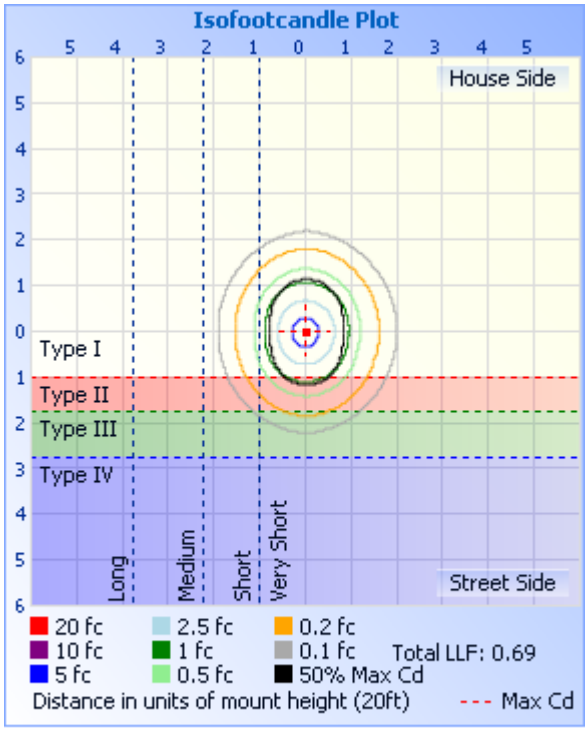
Photometric Data







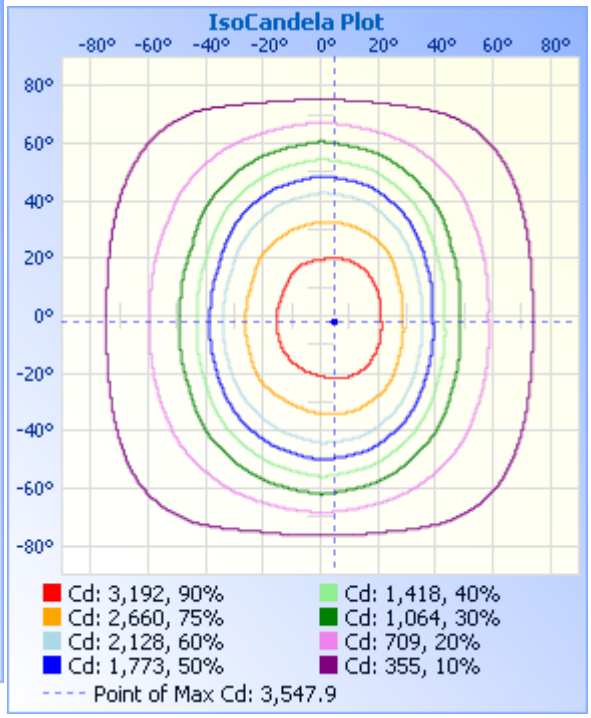


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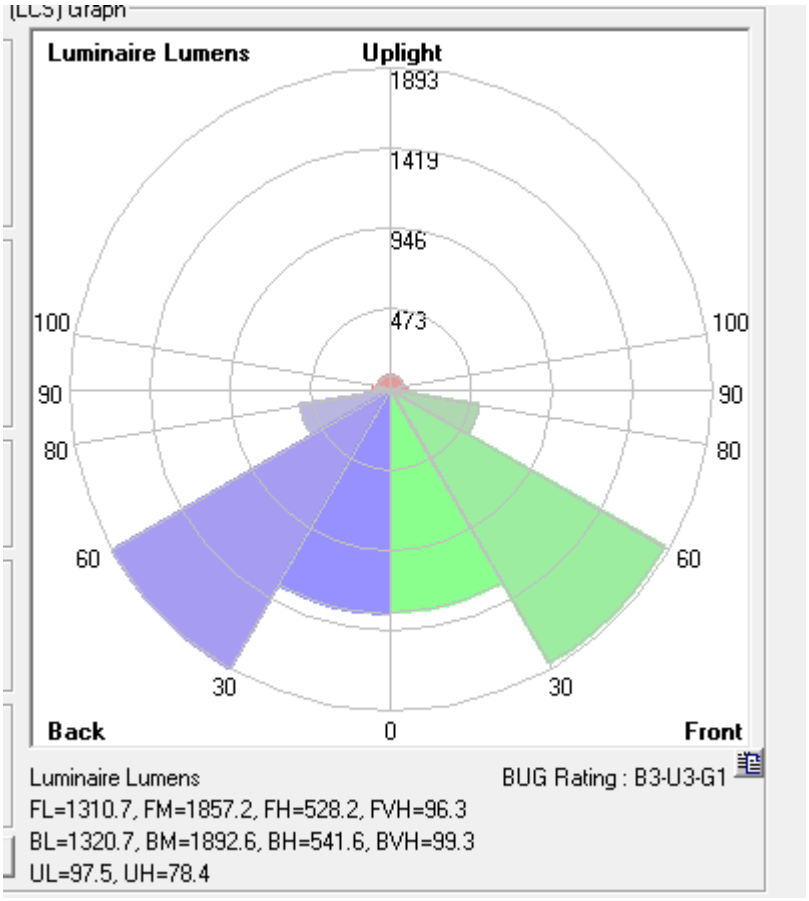
Table--1 UNIT: cd

γ (DEG) \ C (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5		
0	3507	3507	3507	3507	3507	3507	3507	3507	3507	3507	3507	3507	3507	3507	3507	3507		
5	3544	3543	3528	3508	3489	3480	3470	3461	3475	3481	3478	3478	3492	3519	3541	3547		
10	3484	3490	3502	3475	3428	3422	3402	3363	3362	3387	3416	3418	3440	3490	3514	3501		
15	3379	3386	3397	3383	3328	3320	3258	3198	3219	3231	3283	3317	3340	3415	3416	3402		
20	3228	3253	3263	3246	3188	3170	3087	3039	3052	3080	3117	3167	3209	3280	3286	3282		
25	2903	2974	3084	3053	3013	2972	2903	2769	2756	2829	2942	2968	3037	3100	3125	3008		
30	2514	2604	2815	2829	2802	2739	2643	2424	2418	2494	2697	2740	2838	2885	2858	2643		
35	2103	2222	2465	2571	2562	2482	2325	2092	2071	2164	2373	2484	2599	2628	2508	2259		
40	1642	1795	2096	2284	2300	2198	1996	1727	1673	1801	2037	2209	2336	2333	2141	1829		
45	1240	1375	1723	1965	2015	1893	1665	1357	1302	1425	1702	1910	2054	2005	1758	1406		
50	969	1061	1355	1632	1718	1578	1335	1063	1029	1115	1368	1603	1756	1668	1380	1086		
55	796	849	1044	1306	1416	1272	1043	862	848	899	1068	1299	1452	1336	1062	872		
60	660	694	814	1005	1121	989	820	713	707	740	833	1012	1157	1030	829	714		
65	538	566	638	747	847	740	649	586	581	607	656	761	879	765	652	582		
70	426	452	496	532	599	534	511	472	464	489	515	547	624	550	510	466		
75	324	349	377	367	381	371	394	366	353	380	397	377	399	382	390	361		
80	238	262	278	238	203	245	293	271	258	283	294	247	214	251	289	271		
85	176	194	202	146	77.0	154	214	198	189	207	214	153	83.9	158	212	202		
90	137	149	149	92.7	25.1	99.8	157	150	146	156	157	96.5	26.4	102	157	154		
95	114	120	112	40.5	23.7	49.6	117	121	120	124	116	50.7	21.6	57.3	120	126		
100	90.7	77.9	16.9	28.0	21.8	29.7	20.7	87.8	100	92.3	25.3	28.3	19.3	30.6	23.8	88.5		
105	0.90	0.96	48.5	19.9	19.2	21.5	46.4	0.92	0.95	1.04	42.1	20.1	18.1	22.1	41.7	1.06		
110	49.4	57.3	33.8	13.7	16.4	14.7	35.2	56.7	38.5	58.4	34.6	13.9	16.5	15.0	37.6	61.8		
115	48.6	43.8	21.8	7.41	11.8	7.87	23.2	44.0	51.9	45.5	21.6	9.96	14.4	10.0	24.7	48.0		
120	35.0	29.8	12.9	3.83	5.97	3.75	13.6	30.7	38.2	32.2	13.1	4.45	7.52	4.86	15.3	33.7		
125	23.1	18.4	7.23	4.31	5.14	4.13	7.13	19.3	25.6	20.5	7.08	4.45	5.48	4.86	8.95	21.7		
130	13.4	9.92	5.61	7.58	5.98	7.47	5.31	10.6	15.2	11.5	5.50	5.96	4.81	6.35	6.33	12.0		
135	6.66	5.88	5.05	6.23	8.10	6.60	5.07	6.01	7.67	6.36	5.42	6.46	6.74	6.52	5.71	6.47		
140	5.52	5.41	4.87	5.29	7.64	5.72	5.12	5.64	5.68	5.92	5.45	5.87	6.04	6.49	5.66	5.84		
145	5.21	5.27	4.81	5.21	7.82	5.59	5.12	5.56	5.57	5.79	5.45	5.67	5.99	6.52	5.53	5.78		
150	4.99	5.24	3.53	4.86	7.23	5.38	4.46	5.50	5.32	5.76	5.34	5.67	6.48	6.10	4.39	5.78		
155	4.90	5.19	3.71	4.83	6.74	5.36	4.23	5.53	5.24	5.71	4.29	5.54	5.96	5.74	5.50	4.36		
160	3.54	4.01	4.58	5.31	6.40	5.33	5.12	4.27	4.23	4.34	4.55	5.13	5.37	5.85	5.96	4.74		
165	5.12	5.21	4.94	6.03	6.81	6.23	5.09	5.25	5.35	5.22	5.37	5.11	5.84	6.21	6.50	5.37		
170	5.26	5.92	5.65	6.59	8.02	7.27	5.82	5.67	5.60	5.49	5.79	5.62	6.61	7.63	7.68	5.95		
175	5.65	6.20	6.13	6.92	8.64	7.84	6.39	6.06	5.91	5.79	6.29	5.88	6.87	8.49	8.44	6.26		
180	6.04	6.42	6.13	6.95	8.69	7.97	6.12	6.12	6.10	5.98	6.16	5.85	7.02	8.51	8.22	6.34		

BUG


(LCS) Graph
Luminaire Lumens
Uplight
1893
1419
946
473
100
100
90
90
80
80
60
60
30
30
Back
0
Front
Luminaire Lumens
BUG Rating : B3-U3-G1
FL=1310.7, FM=1857.2, FH=528.2, FVH=96.3
BL=1320.7, BM=1892.6, BH=541.6, BVH=99.3
UL=97.5, UH=78.4

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2.2 Electrical, Photometric and Chromaticity Measurements

Test date	2022-08-09	**Test Ambient:**	25±1 ° C
Test Orientation	As intended	**Stabilization Time (min)**	60
Model Number	R5-4VTA60WDHV13PL-3CK (0%,3500K)	**Total Operating Time(min)**	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD220813 NB-D1	120.0	60	0.5021	60.03	0.9964	6.77
	347.0	60	0.1781	59.48	0.9625	15.72

Chromaticity Measurement - Sphere-Spectroradiometer Method(Self-absorption:1.2145)(4π geometry):

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3451
Duv	-0.0008
Chromaticity (x, y)	x=0.4073 y=0.3900
Chromaticity (u', v')	u'=0.2373 v'=0.5112
Color Rendering Index (CRI)	83.9
R9	10
Rg	97
Rf	85
Rcs,h1(%)	-11

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result	
Test Voltage (V)	120	347
Frequency (Hz)	60	60
Total Luminous (lm)	7947	7764
Luminous Efficacy (lm/W)	132.38	130.53

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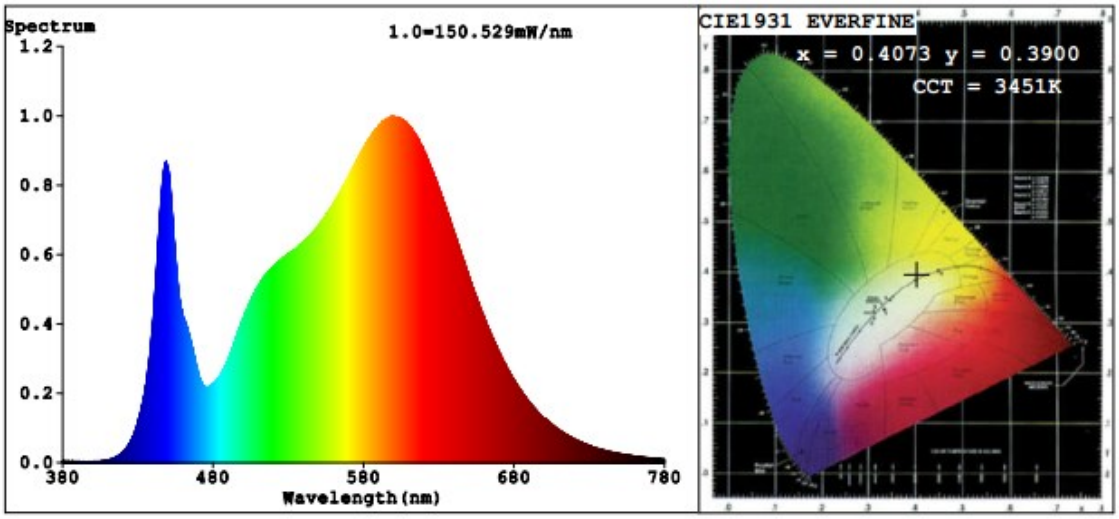
Spectral Power Distribution & Chromaticity Diagram



R1 =82	R2 =91	R3 =96	R4 =83	R5 =83	R6 =88	R7 =85	
R8 =63	R9 =10	R10=79	R11=84	R12=70	R13=84	R14=98	R15=75

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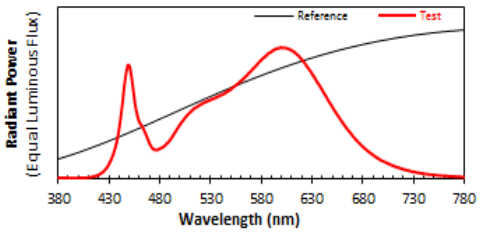
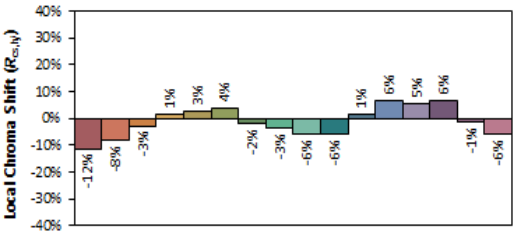
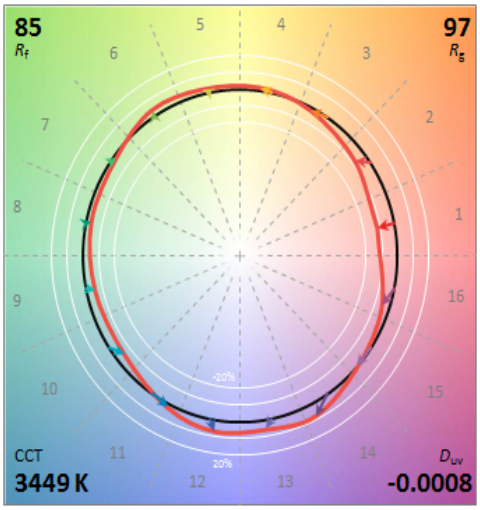
TM30

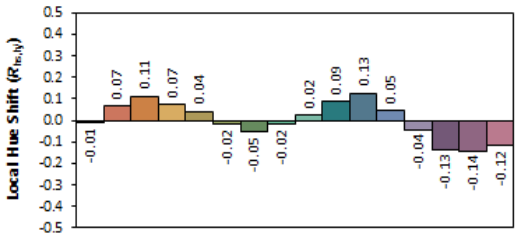
ANSI/IES TM-30-18 Color Rendition Report

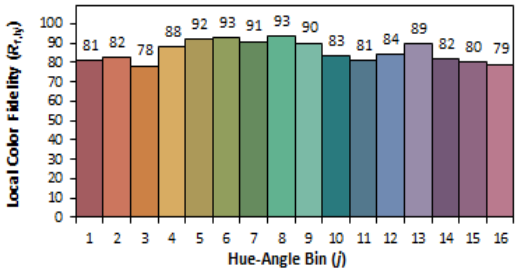
Source:	STW8A2PD-B2	Manufacturer:	Suzhou RUNLUX Electric Ltd
Date:	2022-08-09	Model:	R5-4VTA60WDHV13PL-3CK (0%, 3500K)

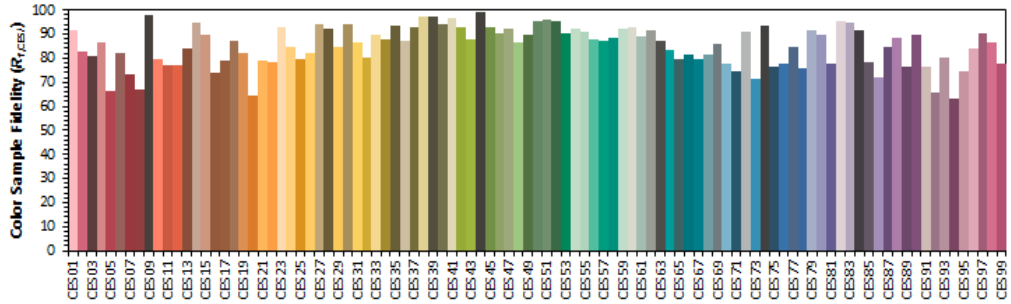












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.4073
y	0.3898
u'	0.2374
v'	0.5112

CIE 13.3-1995 (CRI)	
R_a	84
R_9	10

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

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2.3 Electrical, Photometric and Chromaticity Measurements

Test date	2022-08-09	**Test Ambient:**	25±1 ° C
Test Orientation	As intended	**Stabilization Time (min)**	60
Model Number	R5-4VTA60WDHV13PL-3CK (50%,4000K)	**Total Operating Time(min)**	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD220813 NB-D1	120.0	60	0.4739	56.68	0.9966	6.79
	347.0	60	0.1681	56.17	0.9627	15.73

Chromaticity Measurement - Sphere-Spectroradiometer Method(Self-absorption:1.2149)(4π geometry):

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4188
Duv	0.0001
Chromaticity (x, y)	x=0.3725 y=0.3718
Chromaticity (u', v')	u'=0.2219 v'=0.4982
Color Rendering Index (CRI)	85.0
R9	15
Rg	96
Rf	85
Rcs,h1(%)	-12

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result	
Test Voltage (V)	120	347
Frequency (Hz)	60	60
Total Luminous (lm)	8333	8141
Luminous Efficacy (lm/W)	147.02	144.94

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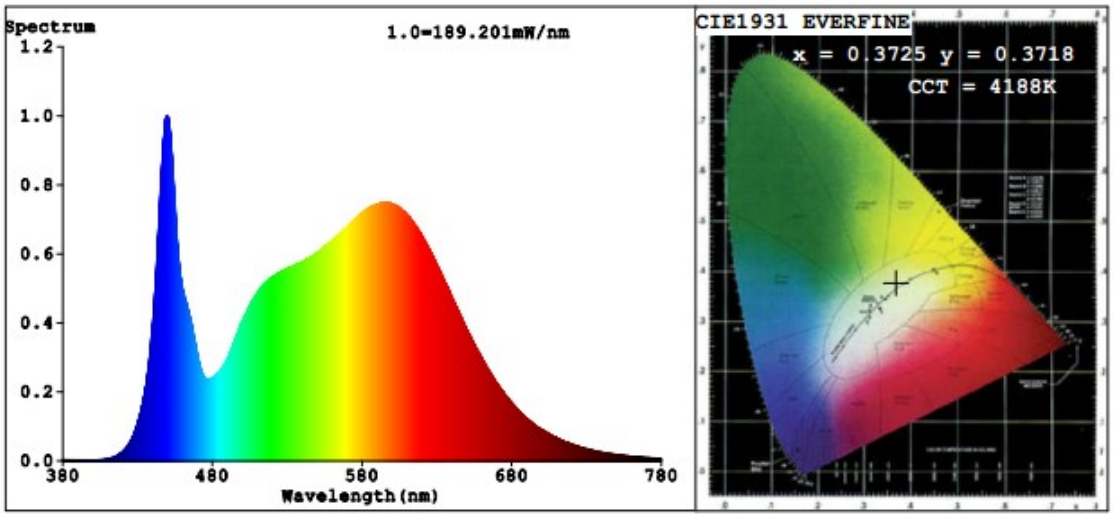
Spectral Power Distribution & Chromaticity Diagram



R1 =84	R2 =91	R3 =95	R4 =85	R5 =84	R6 =87	R7 =87	
R8 =68	R9 =-15	R10=78	R11=85	R12=65	R13=86	R14=98	R15=78

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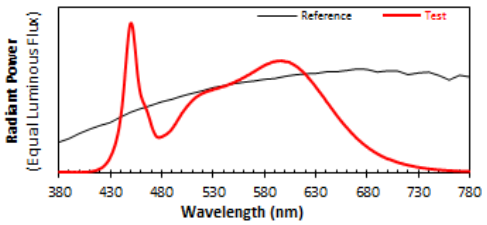
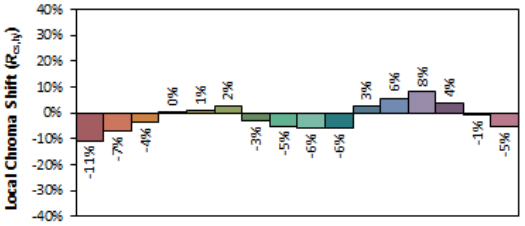
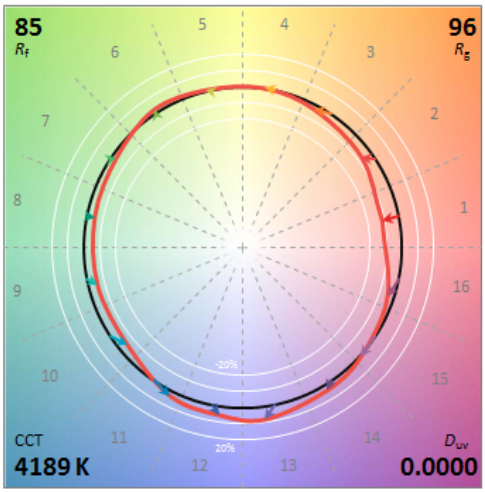
TM30

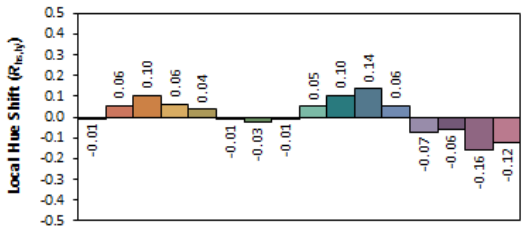
ANSI/IES TM-30-18 Color Rendition Report

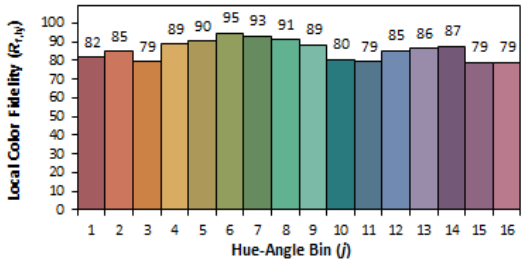
Source:	STW8A2PD-B2	Manufacturer:	Suzhou RUNLUX Electric Ltd
Date:	2022-08-09	Model:	R5-4VTA60WDHV13PL-3CK (50%, 4000K)

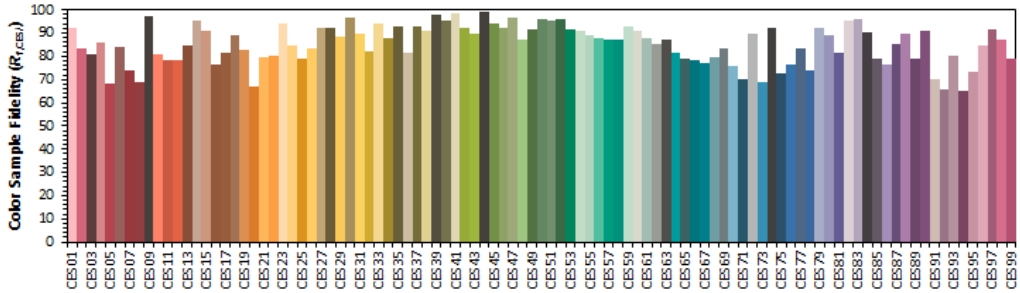












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3725
y	0.3716
u'	0.2219
v'	0.4981

CIE 13.3-1995 (CRI)

R_a	85
R_9	15

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

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2.4 Electrical, Photometric and Chromaticity Measurements

Test date	2022-08-09	**Test Ambient:**	25±1 ° C
Test Orientation	As intended	**Stabilization Time (min)**	60
Model Number	R5-4VTA60WDHV13PL-3CK (100%,5000K)	**Total Operating Time(min)**	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD220813 NB-D1	120.0	60	0.4931	58.98	0.9968	6.81
	347.0	60	0.1750	58.44	0.9623	15.69

Chromaticity Measurement - Sphere-Spectroradiometer Method(Self-absorption:1.2152)(4π geometry):

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	5037
Duv	0.0033
Chromaticity (x, y)	x=0.3446 y=0.3579
Chromaticity (u', v')	u'=0.2087 v'=0.4876
Color Rendering Index (CRI)	83.5
R9	7
Rg	96
Rf	84
Rcs,h1(%)	-12

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result	
Test Voltage (V)	120	347
Frequency (Hz)	60	60
Total Luminous (lm)	8190	8001
Luminous Efficacy (lm/W)	138.86	136.91

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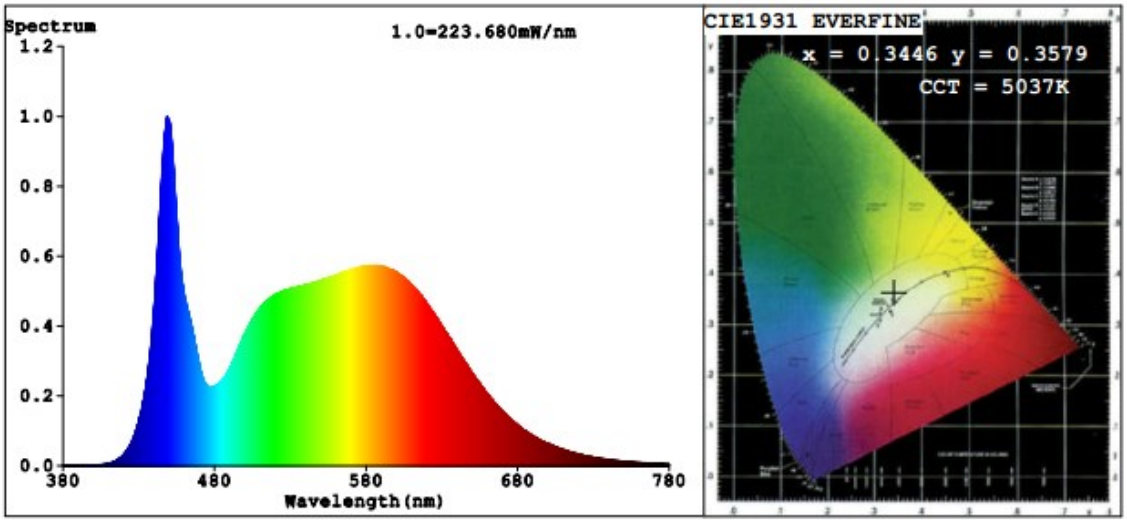
Spectral Power Distribution & Chromaticity Diagram



R1 =82	R2 =88	R3 =93	R4 =84	R5 =83	R6 =84	R7 =87	
R8 =67	R9 =7	R10=72	R11=84	R12=64	R13=83	R14=96	R15=76

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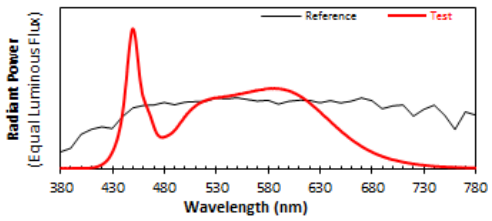
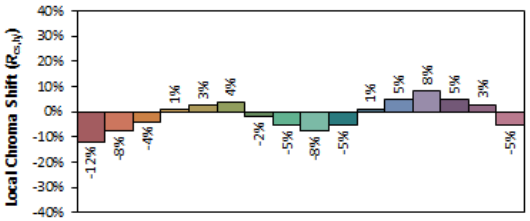
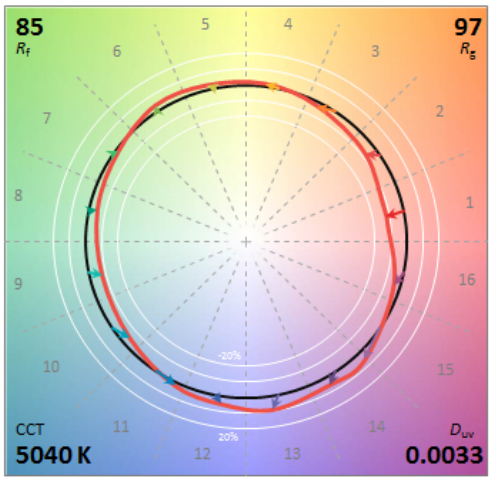
TM30

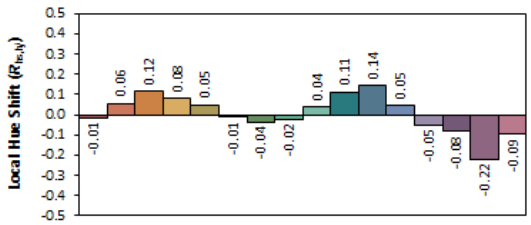
ANSI/IES TM-30-18 Color Rendition Report

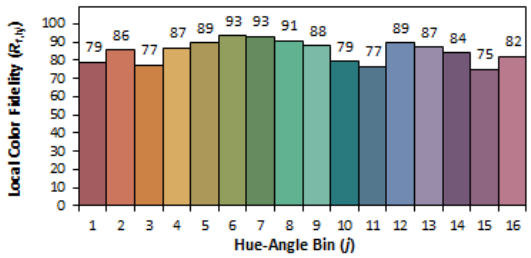
Source:	STW8A2PD-B2	Manufacturer:	Suzhou RUNLUX Electric Ltd
Date:	2022-08-09	Model:	R5-4VTA60WDHV13PL-3CK (100%,5000K)

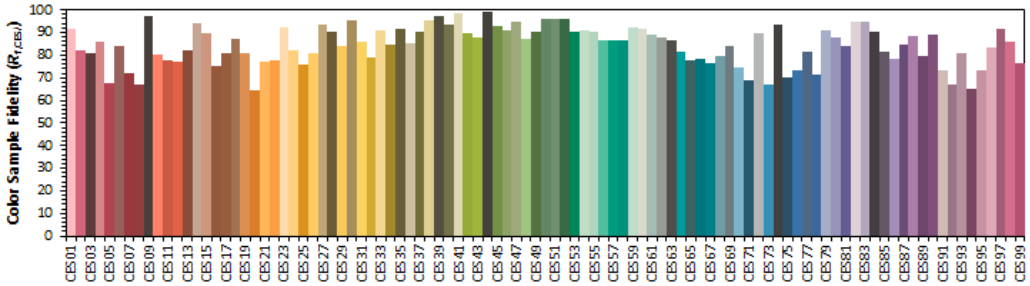












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3446
y	0.3577
u'	0.2087
v'	0.4875

CIE 13.3-1995 (CRI)

R_a	84
R_9	8

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

2.5 Data comparison for different power

Test date	2022-08-09	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	R5-4VTA60WDHV13PL-3CK	Total Operating Time(min)	61

Sample No.	Wattage and CCT setting	Test Voltage (V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
STD220813NB-D1	30W,3500K setting	120.0	4425	31.09	142.33
STD220813NB-D1	45W,3500K setting	120.0	6378	47.13	135.33
STD220813NB-D1	60W,3500K setting	120.0	7821.8	59.44	131.59

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3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-702	2 meter Integrating Sphere	Verified by D204 standard lamp	
ST-R-701	Spectral analysis system HAAS-1200	Verified by D204 standard lamp	
ST-R-703	Standard Lamp D204	2022-01-14	2023-01-13
ST-R-704	Power Meter for Integrating Sphere	2022-01-03	2023-01-02
ST-R-707	Temperature Probe for Integrating Sphere	2022-01-03	2023-01-02
ST-R-714	Goniophotometer system	Verified by D908S standard lamp	
ST-R-710	Standard Lamp D908S	2022-01-14	2023-01-13
ST-R-711	Power Meter for Goniophotometer	2022-01-03	2023-01-02
ST-R-709	Hygrothermograph for Goniophotometer	2022-01-03	2023-01-02
Uncertainty(K=2): Photometric Measurement (Sphere):3.40% Chromaticity Measurement(Sphere):44.8K Photometric Measurement(Goniophotometer):3.64%			

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4. Product Photo

******** END OF REPORT ********