



DesignLights Consortium Test Report

Reference Standards

UL1598-2008

ANSI C82.77-10-2014

IES LM-79-2008

Prepared For

IKIO LED Lightng

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Test Laboratory:

UL-CCIC Company Limited

Test Laboratory Address:

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Catalog Number

IK-RT14F-202530-CCT-D

Project Number

4790446284

Report Number

4790443985

Prepared By

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Zhao, Elaine

Approved By

Elvis Wu

Wu, Elvis

The results contained in this report pertain only to the tested sample.

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Test Summary

DLC Technical Requirements V5.1- issued 2020-02-14

Requirement Category	Test Method	Requirements	Tolerance	Test Result
Minimum Light Output (lm)-Luminaires	IES LM-79-2008	≥1500	-10%	2686.52
Minimum Luminaire Efficacy (lm/W)-Luminaires	IES LM-79-2008	≥110	-3%	128.84
Spacing Criteria (0-180°)	IES LM-79-2008	1.0-2.0	±0.1	1.20
Spacing Criteria (90-270°)	IES LM-79-2008	1.0-2.0	±0.1	1.26
Zonal Lumen Requirement 1(0°-60°)	IES LM-79-2008	≥75%	-3%	82.00%
Allowable CCT (3500K)	IES LM-79-2008/ANSI C78.377-2015	3465±245	N/A	3452
Allowable CCT (4000K)	IES LM-79-2008/ANSI C78.377-2015	3985±275	N/A	4076
Allowable CCT (5000K)	IES LM-79-2008/ANSI C78.377-2015	5029±283	N/A	4924
Minimum CRI	IES LM-79-2008/CIE 13.3-1995	≥80	-1	81
Minimum R9	IES LM-79-2008	≥0	-1	3.0
Minimum Rg	IES LM-79-2008	≥89	-1	94
Minimum Rf	IES LM-79-2008	≥70	-1	82
Rcs,h1	IES LM-79-2008	-12%-23%	-1%	-13%
Unified Glare Rating (UGR)	IES LM-79-2008	≤22	N/A	21.9
L70 Lumen maintenance (Hours)	N/A	≥50000	N/A	≥50000
L90 Lumen maintenance (Hours)	N/A	≥36000	N/A	≥36000
Power Factor	ANSI C82.77-10-2014	≥0.9	-0.03	0.9401
Total Harmonic Distortion (A%)	ANSI C82.77-10-2014	≤20%	5%	15.10%
In-Situ Temperature Measurement Test for LED 1 (°C)	UL1598-2008	≤105	N/A	39.7
In-Situ Temperature Measurement Test for Driver 1 (°C)	UL1598-2008	≤90	N/A	52.5
Max Chromaticity Shift (1000-6000h)	N/A	≤0.004	0.0004	0.0024
Minimum Luminaire Warranty (Years)	N/A	≥5	N/A	≥5



Test List

Sample Received Date: 2022-06-10

Test Item	Test Date	Model Number	Tests Conducted By
Integrating Sphere Test	2022-06-30	IK-RT14F-202530-CCT-D (3500K 30 W)	Yang, Gavin X
Integrating Sphere Test	2022-06-30	IK-RT14F-202530-CCT-D (4000K 30 W)	Yang, Gavin X
Integrating Sphere Test	2022-06-30	IK-RT14F-202530-CCT-D (5000K 30 W)	Yang, Gavin X
Integrating Sphere Test	2022-06-30	IK-RT14F-202530-CCT-D (3500K 25 W)	Yang, Gavin X
Integrating Sphere Test	2022-06-30	IK-RT14F-202530-CCT-D (3500K 20 W)	Yang, Gavin X
Goniophotometer Test	2022-06-29	IK-RT14F-202530-CCT-D (3500K 30 W)	Yang, Gavin X
Goniophotometer Test	2022-06-29	IK-RT14F-202530-CCT-D (5000K 30 W)	Yang, Gavin X
THD and PF Test	2022-06-29	IK-RT14F-202530-CCT-D (3500K 30 W)	Yang, Gavin X
THD and PF Test	2022-06-29	IK-RT14F-202530-CCT-D (4000K 30 W)	Yang, Gavin X
THD and PF Test	2022-06-29	IK-RT14F-202530-CCT-D (5000K 30 W)	Yang, Gavin X
THD and PF Test	2022-06-29	IK-RT14F-202530-CCT-D (3500K 25 W)	Yang, Gavin X
THD and PF Test	2022-06-29	IK-RT14F-202530-CCT-D (3500K 20 W)	Yang, Gavin X
In-Situ Temperature Measurement Test	2022-07-04	IK-RT14F-202530-CCT-D (3500K 30 W)	Yang, Gavin X

Remark (if any)

1. UL test equipment information is recorded on Meter Use in UL's Aurora database.
2. The accuracy method decision rule is applied when the compliance or verdict is made to the results of this report.



Product Description

Lamp/Luminaire Description: Integrated Retrofit Kits for 1x4
 Luminaires **Model Number:** IK-RT14F-202530-CCT-D (3500K 30 W)
Electrical Parameter: 120-277V, 50/60Hz
LED Package: STW8A2PD-XX
Dimming Information: Continuous dimming capability
Remark: Housing model GT8 2 32 A12 MVOLT GEB10IS

Products Scaled Value

Model Number	CCT	Luminous Flux	Power	Luminous Efficacy
IK-RT14F-202530-CCT-D (3500K)	3500K	3810	30	127
IK-RT14F-202530-CCT-D (4000K)	4000K	3840	30	128
IK-RT14F-202530-CCT-D (5000K)	5000K	3870	30	129
IK-RT14F-202530-CCT-D (3500K)	3500K	3250	25	130
IK-RT14F-202530-CCT-D (4000K)	4000K	3275	25	131
IK-RT14F-202530-CCT-D (5000K)	5000K	3300	25	132
IK-RT14F-202530-CCT-D (3500K)	3500K	2660	20	133
IK-RT14F-202530-CCT-D (4000K)	4000K	2680	20	134
IK-RT14F-202530-CCT-D (5000K)	5000K	2700	20	135





Integrating Sphere Test

Model No.	IK-RT14F-202530-CCT-D (3500K 30 W)		Sample ID.	5044126
Operate time (Min.)	90	Stabilization time (Min.)	45	

Test Method

1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.

2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.

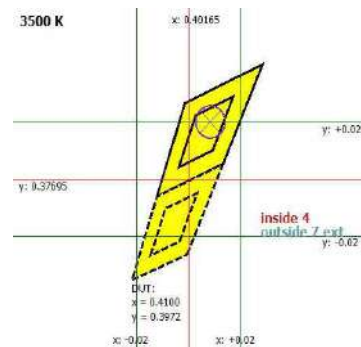
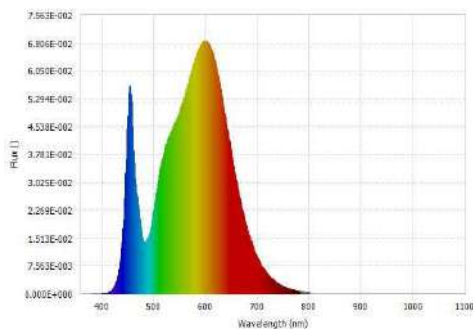
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.9	120.01	60	0.2459	29.144	0.9877	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3452	81	3.0	0.0018	3780.66	129.72	N/A

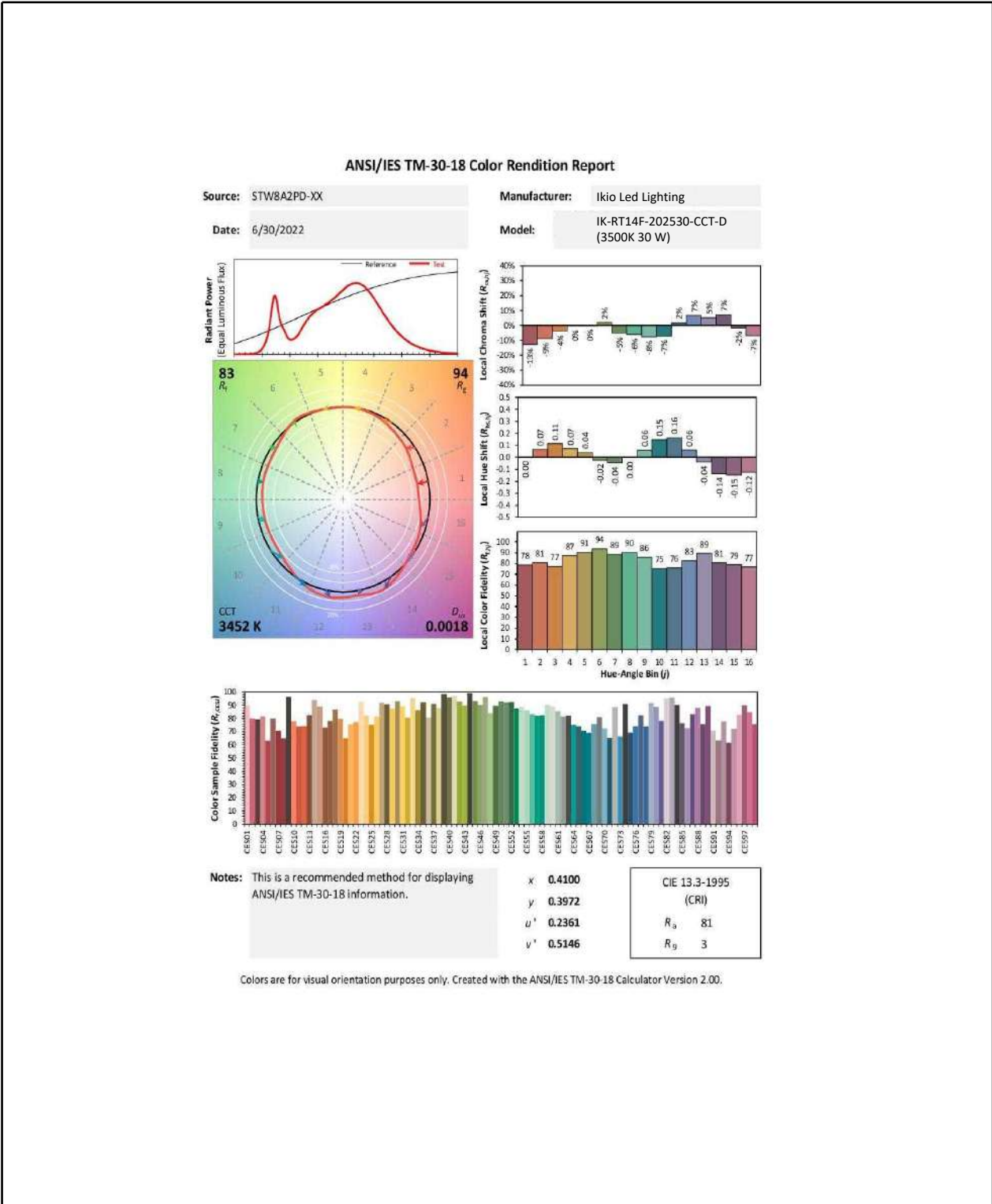


Luminous Flux (lm)	3780.66	Chrom x	0.4100
Chrom y	0.3972	Chrom u	0.2361
Chrom v	0.3431	Duv	0.0018
Chrom u'	0.2361	Chrom v'	0.5146
CCT (K)	3452	Luminous Efficacy (lm/W)	129.72
Ra	81	R1	79.0
R2	88.0	R3	95.0
R4	79.0	R5	79.0
R6	84.0	R7	85.0
R8	60.0	R9	3.0
R10	72.0	R11	77.0
R12	58.0	R13	81.0
R14	97.0	R15	72.0
Rf	83	Rg	94
Rcs,h1	-13%		



Integrating Sphere Test (Cont'd)

TM-30 Report





Integrating Sphere Test

Model No.	IK-RT14F-202530-CCT-D (4000K 30W)	Sample ID.	5044126
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

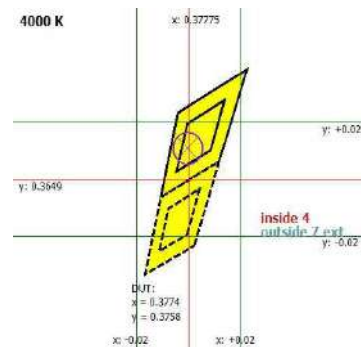
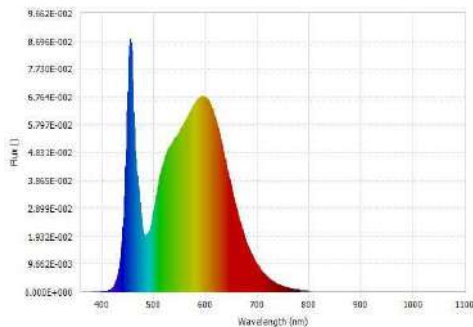
1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.
 2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
 3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.9	119.99	60	0.2374	28.14	0.9877	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
4076	83	11.0	0.0004	4046.17	143.79	N/A



Luminous Flux (lm)	4046.17	Chrom x	0.3774
Chrom y	0.3758	Chrom u	0.2235
Chrom v	0.3338	Duv	0.0004
Chrom u'	0.2235	Chrom v'	0.5007
CCT (K)	4076	Luminous Efficacy (lm/W)	143.79
Ra	83	R1	81.0
R2	90.0	R3	94.0
R4	81.0	R5	81.0
R6	84.0	R7	86.0
R8	65.0	R9	11.0
R10	74.0	R11	79.0
R12	56.0	R13	84.0
R14	97.0	R15	76.0
Rf	83	Rg	94
Rcs,h1	-12%		



Integrating Sphere Test (Cont'd)

TM-30 Report

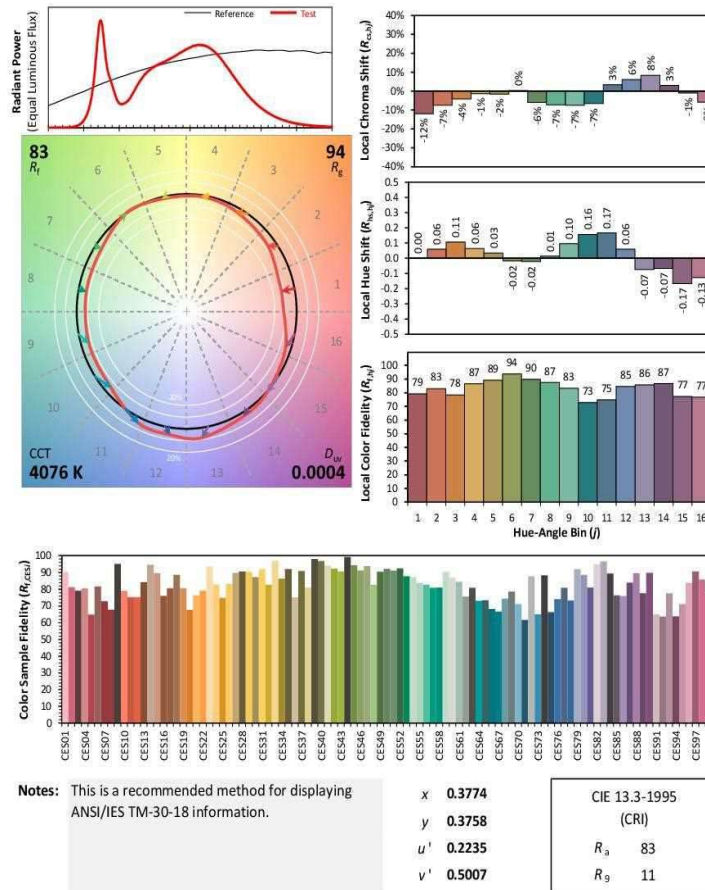
ANSI/IES TM-30-18 Color Rendition Report

Source: STW8A2PD-XX

Manufacturer: Ikiro Led Lighting

Date: 6/30/2022

Model: IK-RT14F-202530-CCT-D
(4000K 30 W)



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



Integrating Sphere Test

Model No.	IK-RT14F-202530-CCT-D (5000K 30W)		Sample ID.	5044126
Operate time (Min.)	90	Stabilization time (Min.)	45	

Test Method

1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.

2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.

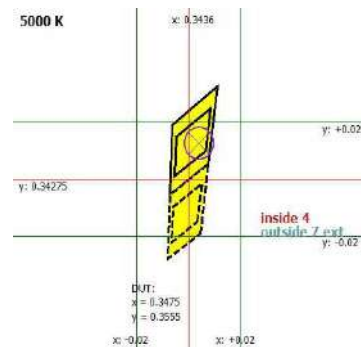
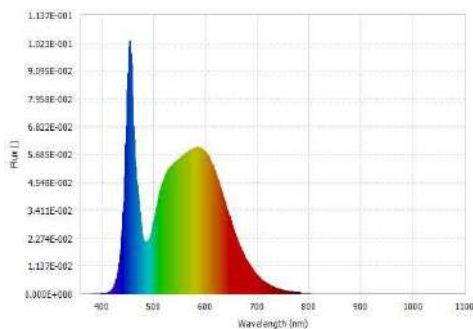
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.9	119.99	60	0.2459	29.144	0.9877	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
4924	82	10.0	0.0010	3823.64	131.20	N/A



Luminous Flux (lm)	3823.64	Chrom x	0.3475
Chrom y	0.3555	Chrom u	0.2115
Chrom v	0.3246	Duv	0.0010
Chrom u'	0.2115	Chrom v'	0.4869
CCT (K)	4924	Luminous Efficacy (lm/W)	131.20
Ra	82	R1	81.0
R2	88.0	R3	92.0
R4	81.0	R5	80.0
R6	82.0	R7	88.0
R8	68.0	R9	10.0
R10	70.0	R11	79.0
R12	52.0	R13	83.0
R14	96.0	R15	76.0
Rf	82	Rg	96
Rcs,h1	-12%		



Integrating Sphere Test (Cont'd)

TM-30 Report

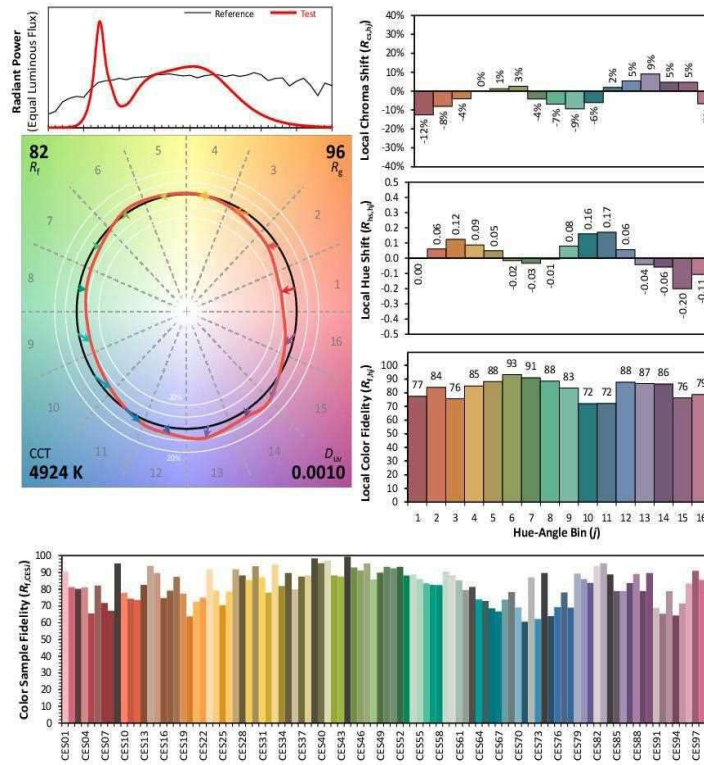
ANSI/IES TM-30-18 Color Rendition Report

Source: STW8A2PD-XX

Manufacturer: Ikio Led Lighting

Date: 6/30/2022

Model: IK-RT14F-202530-CCT-D
(5000K 30 W)



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

x 0.3475
y 0.3555
u' 0.2115
v' 0.4869

CIE 13.3-1995
(CRI)

R_a 82
 R_9 10

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



Integrating Sphere Test

Model No.	IK-RT14F-202530-CCT-D (3500K 25W)		Sample ID.	5044126
Operate time (Min.)	90	Stabilization time (Min.)	45	

Test Method

1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.

2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.

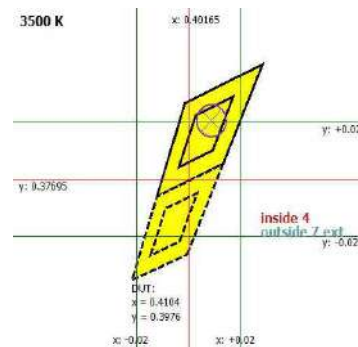
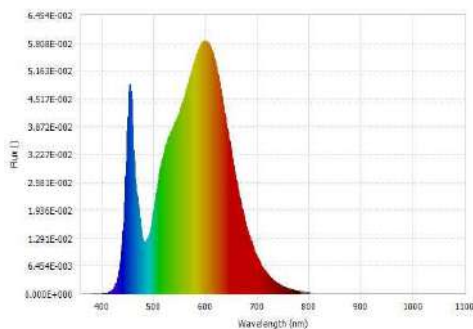
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions was using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.9	120.07	60	0.2024	23.908	0.9840	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3447	81	3.0	0.0019	3222.95	134.81	N/A



Luminous Flux (lm)	3222.95	Chrom x	0.4104
Chrom y	0.3976	Chrom u	0.2362
Chrom v	0.3432	Duv	0.0019
Chrom u'	0.2362	Chrom v'	0.5148
CCT (K)	3447	Luminous Efficacy (lm/W)	134.81
Ra	81	R1	79.0
R2	88.0	R3	95.0
R4	79.0	R5	79.0
R6	84.0	R7	85.0
R8	61.0	R9	3.0
R10	72.0	R11	77.0
R12	58.0	R13	81.0
R14	97.0	R15	72.0
Rf	83	Rg	94
Rcs,h1	-13%		



Integrating Sphere Test (Cont'd)

TM-30 Report

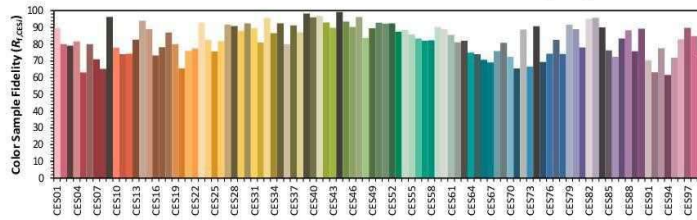
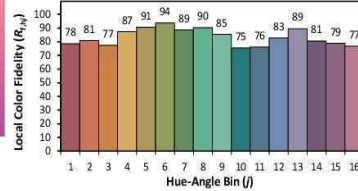
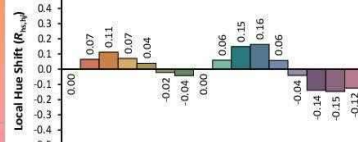
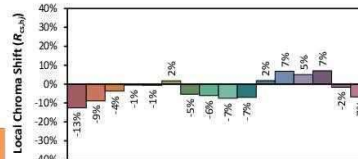
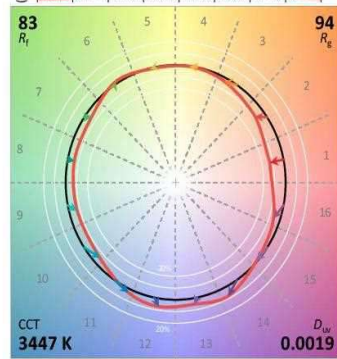
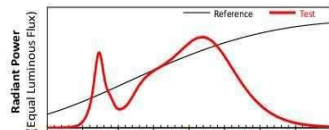
ANSI/IES TM-30-18 Color Rendition Report

Source: STW8A2PD-XX

Manufacturer: Ikio Led Lighting

Date: 6/30/2022

Model: IK-RT14F-202530-CCT-D
(3500K 25 W)



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

x 0.4104
 y 0.3976
 u' 0.2362
 v' 0.5148

CIE 13.3-1995
(CRI)
 R_a 81
 R_s 3

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



Integrating Sphere Test

Model No.	IK-RT14F-202530-CCT-D (3500K 20W)	Sample ID.	5044126
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

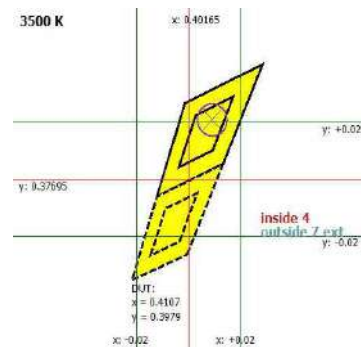
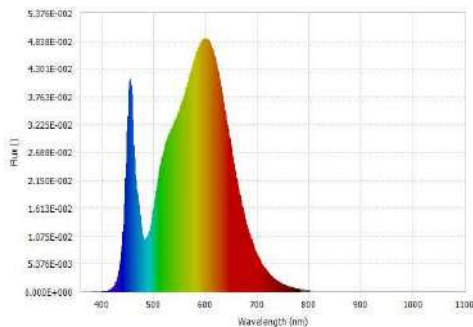
1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.
 2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
 3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions was using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.9	120.08	60	0.1640	19.27	0.9786	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3442	81	4.0	0.0019	2686.52	139.41	N/A



Luminous Flux (lm)	2686.52	Chrom x	0.4107
Chrom y	0.3979	Chrom u	0.2363
Chrom v	0.3433	Duv	0.0019
Chrom u'	0.2363	Chrom v'	0.5150
CCT (K)	3442	Luminous Efficacy (lm/W)	139.41
Ra	81	R1	79.0
R2	88.0	R3	95.0
R4	79.0	R5	79.0
R6	84.0	R7	85.0
R8	61.0	R9	4.0
R10	72.0	R11	78.0
R12	58.0	R13	82.0
R14	97.0	R15	72.0
Rf	83	Rg	94
Rcs,h1	-13%		



Integrating Sphere Test (Cont'd)

TM-30 Report

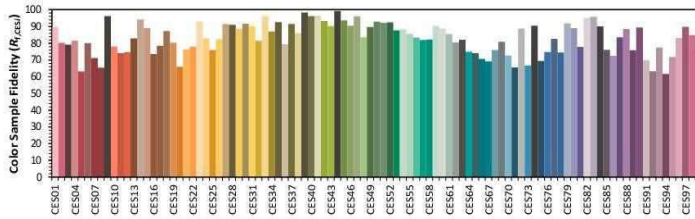
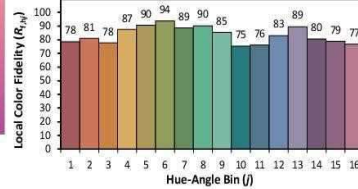
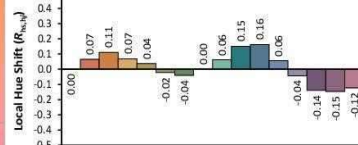
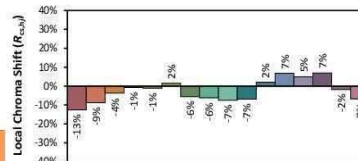
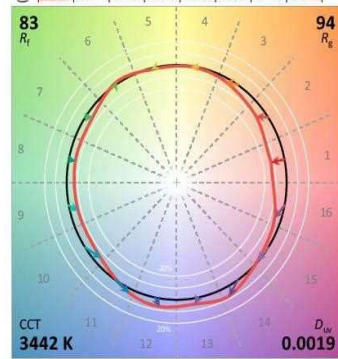
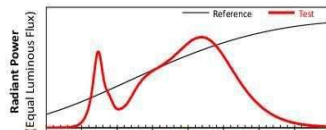
ANSI/IES TM-30-18 Color Rendition Report

Source: STW8A2PD-XX

Manufacturer: Ikio Led Lighting

Date: 6/30/2022

Model: IK-RT14F-202530-CCT-D (3500K 20 W)



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

x 0.4107
y 0.3979
u' 0.2363
v' 0.5150

CIE 13.3-1995 (CRI)
 R_a 81
 R_g 4

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



Goniophotometer Test

Model No.	IK-RT14F-202530-CCT-D (3500K 30W)	Sample ID.	5044126
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

- 1.The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
- 2.Photometric parameters were measured using a type C goniophotometer and software.
- 3.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 reference standard lamp is rated current 3.8581A, 3.8558A, 3.8466A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
- 4.The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonallumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals. Photometric distance was more than five times of the largest dimension of the test SSL product.

Goniophotometer Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.4	119.96	60	0.2458	29.163	0.9890	12.45%	Horizontal

Test Results

Luminous Flux (lm)	Zonal Lumen Requirement 1	Zonal Lumen Requirement 2	Beam Angle (50%)		Luminous Efficacy (lm/W)
	0°-60°	N/A	Horizontal Spread	Vertical Spread	
3757.4	82.30%	N/A	111.8	94.7	128.84

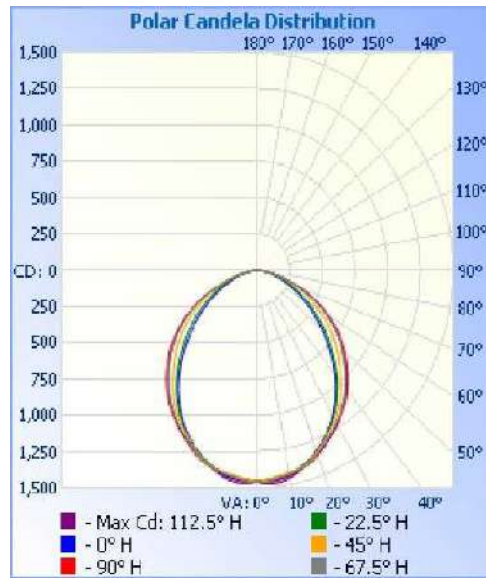
Backlight	Uplight	Glare
N/A	N/A	N/A

UGR		Spacing Criteria (0-180°)	Spacing Criteria (90°-270°)
Crosswise	Endwise		
20.2	21.9	1.20	1.26

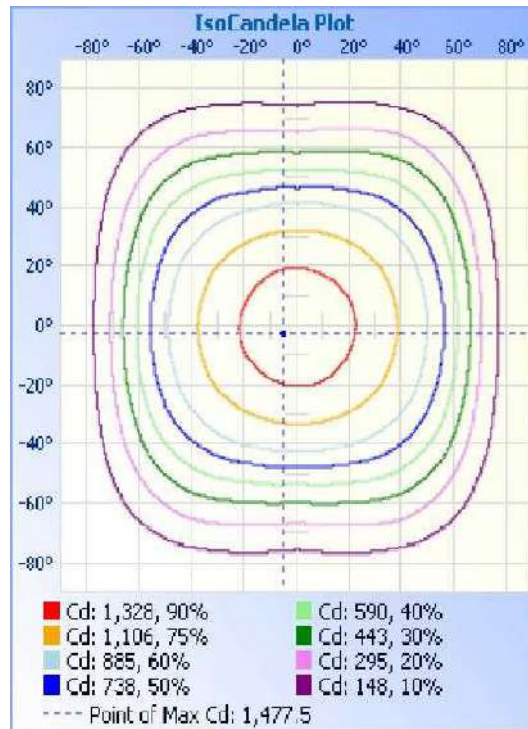


Goniophotometer Test (Cont'd)

Polar Candela Distribution



IsoCandela Plot





Goniophotometer Test (Cont'd)
Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1116.7	29.70%
0-40	1807.9	48.10%
0-60	3088.0	82.20%
60-90	658.4	17.50%
70-100	247.5	6.60%
90-120	3.1	0.10%
0-90	3746.4	99.70%
90-180	11.0	0.30%
0-180	3757.4	100.00%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-5	34.8	0.90%	90-95	0.6	0.00%
5-10	103.3	2.80%	95-100	0.5	0.00%
10-15	167.8	4.50%	100-105	0.5	0.00%
15-20	225.5	6.00%	105-110	0.5	0.00%
20-25	273.4	7.30%	110-115	0.5	0.00%
25-30	311.9	8.30%	115-120	0.5	0.00%
30-35	338.6	9.00%	120-125	0.6	0.00%
35-40	352.5	9.40%	125-130	0.7	0.00%
40-45	351.7	9.40%	130-135	0.7	0.00%
45-50	337.9	9.00%	135-140	0.8	0.00%
50-55	313.2	8.30%	140-145	0.9	0.00%
55-60	277.4	7.40%	145-150	0.9	0.00%
60-65	232.2	6.20%	150-155	0.8	0.00%
65-70	179.9	4.80%	155-160	0.8	0.00%
70-75	125.7	3.30%	160-165	0.7	0.00%
75-80	77.4	2.10%	165-170	0.6	0.00%
80-85	36.2	1.00%	170-175	0.4	0.00%
85-90	7.0	0.20%	175-180	0.1	0.00%



Goniophotometer Test (Cont'd)
Intensity Data(cd)

Candela Table - Type C

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	1455	1455	1455	1455	1455	1455	1455	1455	1455	1455	1455	1455	1455	1455	1455	1455	1455
1	1452	1450	1452	1462	1465	1463	1454	1452	1452	1449	1451	1462	1463	1460	1454	1451	1452
2	1451	1446	1440	1461	1460	1470	1462	1457	1452	1445	1447	1459	1465	1467	1462	1457	1451
3	1451	1443	1444	1459	1460	1474	1467	1458	1452	1444	1444	1457	1463	1471	1467	1459	1451
4	1452	1440	1439	1454	1464	1476	1471	1462	1451	1440	1439	1453	1463	1473	1470	1461	1452
5	1450	1436	1432	1448	1460	1478	1475	1462	1449	1438	1433	1447	1458	1474	1471	1461	1450
6	1448	1435	1426	1442	1455	1474	1473	1462	1449	1435	1428	1441	1453	1473	1470	1460	1448
7	1444	1432	1422	1436	1452	1470	1470	1459	1445	1432	1423	1436	1450	1468	1468	1458	1444
8	1440	1431	1418	1432	1440	1465	1467	1455	1441	1430	1418	1430	1446	1462	1464	1452	1440
9	1434	1428	1415	1428	1444	1459	1462	1451	1437	1426	1417	1426	1442	1456	1458	1448	1434
10	1430	1425	1413	1423	1438	1451	1454	1445	1432	1425	1414	1422	1438	1449	1450	1442	1430
11	1423	1420	1411	1419	1431	1441	1444	1437	1424	1420	1411	1418	1432	1441	1441	1433	1423
12	1416	1412	1408	1413	1423	1431	1432	1426	1417	1414	1408	1413	1425	1431	1432	1422	1416
13	1405	1405	1405	1410	1417	1420	1420	1416	1407	1406	1406	1410	1417	1420	1419	1410	1405
14	1395	1396	1390	1406	1408	1410	1400	1404	1399	1397	1402	1407	1409	1410	1406	1400	1395
15	1385	1388	1392	1401	1401	1401	1395	1393	1390	1389	1394	1402	1401	1400	1394	1387	1385
16	1375	1370	1306	1396	1395	1391	1384	1380	1379	1380	1386	1396	1393	1390	1383	1375	1375
17	1366	1367	1374	1387	1388	1382	1372	1368	1369	1371	1377	1388	1386	1380	1370	1364	1366
18	1353	1357	1362	1377	1379	1372	1360	1355	1355	1360	1365	1378	1379	1371	1359	1352	1353
19	1340	1344	1349	1364	1370	1361	1348	1341	1343	1348	1353	1365	1369	1361	1346	1339	1340
20	1325	1330	1334	1348	1358	1350	1334	1328	1328	1335	1340	1351	1358	1350	1335	1324	1325
25	1248	1254	1262	1276	1289	1291	1275	1258	1255	1260	1265	1280	1290	1288	1274	1253	1248
30	1157	1169	1188	1212	1226	1220	1200	1174	1161	1175	1194	1217	1229	1222	1202	1172	1157
35	1047	1063	1104	1141	1154	1142	1108	1070	1054	1073	1111	1146	1157	1145	1110	1068	1047
40	926	947	999	1051	1075	1062	1013	957	933	960	1009	1057	1078	1064	1016	956	926
45	792	819	886	950	975	958	905	834	798	834	901	959	982	965	912	836	792
50	658	694	779	851	874	852	786	706	666	711	795	860	880	858	794	709	658
55	531	571	663	740	764	742	671	583	541	589	679	747	761	744	677	584	531
60	412	452	541	613	636	618	553	465	422	470	559	616	630	616	558	468	412
65	308	344	421	479	491	486	436	360	316	361	438	481	474	476	436	362	308
70	220	250	309	335	334	343	323	266	228	268	325	323	303	316	320	266	220
75	144	170	203	205	202	212	214	163	153	186	212	194	178	187	204	182	144
80	79	98	111	107	105	113	121	108	86	112	116	98	88	92	106	104	79
85	28	36	35	32	31	36	42	44	35	45	37	27	23	24	29	36	28
90	1	1	1	2	2	2	2	2	3	2	1	1	1	1	1	2	1
95	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
105	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1
110	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1
115	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
120	1	1	1	1	1	1	1	2	1	1	2	2	2	1	1	1	1
125	2	2	1	2	2	1	1	1	1	2	2	1	1	2	1	2	2
130	2	2	2	2	2	2	2	1	1	2	2	2	2	1	2	2	2
135	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
140	2	2	2	2	3	3	3	2	2	2	2	2	2	2	2	2	2
145	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
150	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
155	3	3	4	3	3	4	3	4	4	3	4	4	4	3	3	3	3
160	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
165	5	5	5	5	5	4	5	5	5	4	4	4	4	5	5	4	5
170	6	5	5	5	6	6	5	5	5	5	5	6	5	5	6	6	6
175	5	6	5	5	6	5	6	6	5	6	5	6	5	5	5	6	5
180	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6



Goniophotometer Test

Model No.	IK-RT14F-202530-CCT-D (5000K 30W)	Sample ID.	5044126
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

- 1.The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
- 2.Photometric parameters were measured using a type C goniophotometer and software.
- 3.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 reference standard lamp is rated current 3.8581A, 3.8558A, 3.8466A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
- 4.The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonallumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals. Photometric distance was more than five times of the largest dimension of the test SSL product.

Goniophotometer Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.4	119.96	60	0.2458	29.16	0.9890	12.46%	Horizontal

Test Results

Luminous Flux (lm)	Zonal Lumen Requirement 1	Zonal Lumen Requirement 2	Beam Angle (50%)		Luminous Efficacy (lm/W)
	0°-60°	N/A	Horizontal Spread	Vertical Spread	
3807.4	82.00%	N/A	112.7	95.6	130.57

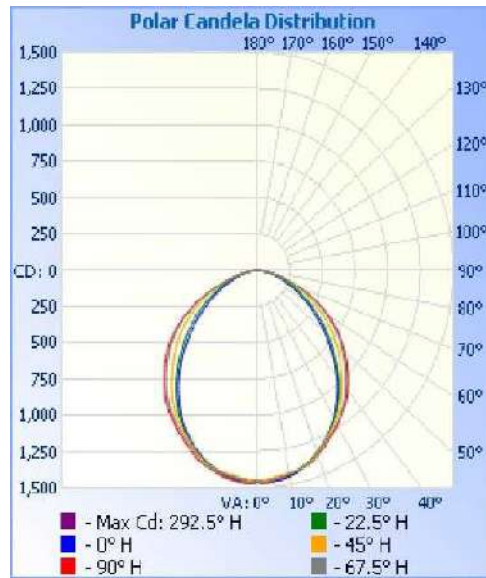
Backlight	Uplight	Glare
N/A	N/A	N/A

UGR		Spacing Criteria (0-180°)	Spacing Criteria (90°-270°)
Crosswise	Endwise		
20.7	21.9	1.20	1.26

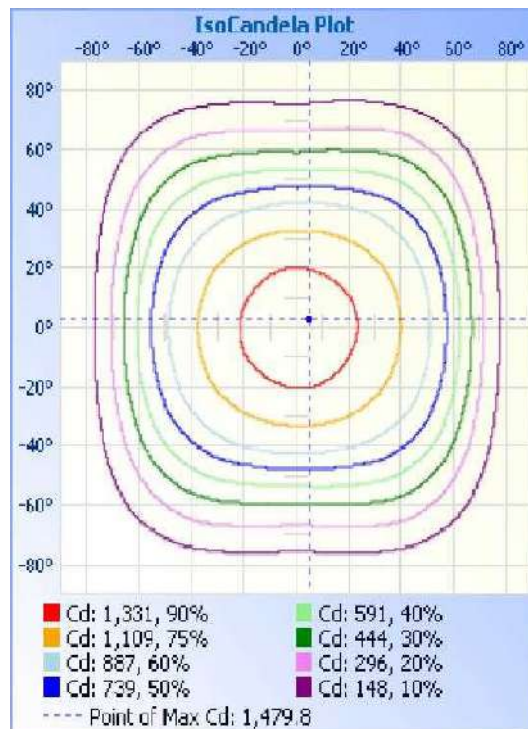


Goniophotometer Test (Cont'd)

Polar Candela Distribution



IsoCandela Plot





Goniophotometer Test (Cont'd)
Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1122.4	29.50%
0-40	1821.1	47.80%
0-60	3122.3	82.00%
60-90	673.7	17.70%
70-100	254.1	6.70%
90-120	3.4	0.10%
0-90	3795.9	99.70%
90-180	11.4	0.30%
0-180	3807.4	100.00%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-5	34.9	0.90%	90-95	0.7	0.00%
5-10	103.6	2.70%	95-100	0.6	0.00%
10-15	168.3	4.40%	100-105	0.6	0.00%
15-20	226.3	5.90%	105-110	0.5	0.00%
20-25	275.0	7.20%	110-115	0.5	0.00%
25-30	314.3	8.30%	115-120	0.5	0.00%
30-35	341.9	9.00%	120-125	0.6	0.00%
35-40	356.8	9.40%	125-130	0.7	0.00%
40-45	356.4	9.40%	130-135	0.8	0.00%
45-50	343.1	9.00%	135-140	0.8	0.00%
50-55	318.9	8.40%	140-145	0.9	0.00%
55-60	282.8	7.40%	145-150	0.9	0.00%
60-65	236.8	6.20%	150-155	0.8	0.00%
65-70	184.0	4.80%	155-160	0.8	0.00%
70-75	128.8	3.40%	160-165	0.7	0.00%
75-80	79.3	2.10%	165-170	0.6	0.00%
80-85	37.4	1.00%	170-175	0.4	0.00%
85-90	7.4	0.20%	175-180	0.1	0.00%



Goniophotometer Test (Cont'd)
Intensity Data(cd)

Candela Table - Type C

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457
1	1453	1452	1453	1464	1469	1463	1454	1454	1452	1452	1454	1464	1470	1465	1456	1456	1455
2	1454	1440	1450	1462	1460	1469	1463	1450	1453	1449	1449	1462	1471	1473	1465	1460	1454
3	1454	1445	1446	1459	1408	1472	1467	1462	1452	1446	1447	1460	1471	1476	1472	1462	1455
4	1455	1442	1441	1455	1465	1475	1469	1462	1453	1443	1442	1456	1471	1479	1474	1464	1455
5	1452	1439	1434	1450	1462	1475	1473	1463	1450	1440	1436	1448	1465	1480	1478	1468	1455
6	1454	1437	1430	1444	1456	1473	1472	1463	1450	1439	1429	1444	1462	1478	1477	1466	1452
7	1451	1436	1425	1440	1453	1470	1469	1459	1447	1436	1425	1439	1458	1475	1474	1463	1450
8	1448	1433	1421	1434	1449	1465	1465	1455	1442	1434	1421	1435	1454	1470	1471	1460	1447
9	1444	1430	1418	1429	1444	1458	1460	1450	1439	1433	1420	1431	1452	1464	1465	1457	1443
10	1438	1428	1416	1423	1439	1451	1453	1444	1433	1420	1418	1425	1447	1455	1458	1450	1438
11	1432	1422	1414	1420	1432	1442	1442	1435	1425	1423	1416	1421	1440	1446	1449	1441	1432
12	1424	1417	1412	1415	1424	1431	1432	1425	1418	1418	1413	1419	1433	1436	1437	1431	1422
13	1416	1409	1409	1412	1416	1420	1420	1415	1408	1410	1410	1416	1425	1426	1425	1421	1414
14	1405	1402	1404	1409	1408	1412	1408	1403	1400	1402	1405	1413	1417	1418	1414	1410	1405
15	1396	1394	1398	1404	1401	1401	1396	1391	1389	1393	1398	1409	1412	1410	1404	1398	1396
16	1386	1383	1390	1400	1394	1392	1384	1379	1380	1384	1391	1404	1405	1400	1394	1387	1385
17	1375	1374	1380	1391	1385	1383	1372	1367	1369	1374	1382	1394	1398	1391	1383	1374	1376
18	1364	1363	1369	1381	1377	1372	1360	1354	1357	1362	1371	1385	1391	1381	1368	1362	1363
19	1352	1352	1356	1368	1369	1361	1348	1341	1344	1350	1357	1373	1384	1371	1358	1350	1351
20	1337	1340	1343	1354	1357	1350	1334	1328	1330	1336	1345	1358	1371	1362	1345	1337	1336
25	1262	1266	1270	1283	1292	1292	1276	1259	1256	1266	1275	1290	1307	1306	1290	1271	1265
30	1175	1181	1190	1218	1229	1221	1202	1174	1165	1181	1205	1231	1246	1238	1219	1190	1175
35	1068	1082	1116	1149	1158	1145	1111	1072	1056	1082	1125	1164	1180	1166	1132	1090	1068
40	948	964	1011	1056	1078	1064	1015	958	936	966	1024	1077	1104	1090	1042	979	950
45	814	838	900	955	978	960	907	834	800	838	914	981	1009	991	937	858	814
50	680	715	791	854	873	852	786	707	665	714	809	886	909	888	821	731	680
55	551	590	673	742	760	738	669	582	539	592	695	774	795	778	707	607	553
60	429	466	552	615	634	612	549	462	417	469	570	640	657	646	587	487	430
65	325	359	434	483	487	480	430	356	312	358	444	495	497	504	453	380	325
70	234	264	321	340	328	324	317	262	224	264	326	336	324	344	344	284	235
75	157	182	213	211	200	204	206	177	145	181	211	200	190	206	223	198	156
80	90	109	121	109	100	103	111	101	80	105	113	101	97	106	123	118	90
85	36	44	40	33	27	29	33	36	29	39	35	30	29	34	42	48	36
90	3	2	2	2	1	1	1	1	1	1	1	2	1	2	2	2	3
95	1	1	2	1	1	2	1	2	1	1	1	1	2	1	1	1	1
100	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
105	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
110	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
115	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
120	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1
125	2	2	2	1	1	2	1	1	1	1	2	1	2	1	1	1	1
130	2	2	2	2	2	2	1	2	2	1	2	2	2	2	2	2	2
135	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
140	3	2	2	3	3	2	2	3	3	3	3	2	2	2	3	3	2
145	2	3	3	2	3	3	3	3	3	3	2	3	3	2	2	3	2
150	3	3	3	4	3	3	3	3	3	3	3	3	3	3	3	3	3
155	4	4	3	4	4	4	3	4	4	4	4	4	4	4	4	4	4
160	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
165	4	5	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5
170	5	5	5	6	5	6	5	6	5	5	5	6	6	6	5	6	5
175	6	5	6	5	6	6	5	6	6	5	5	5	6	6	5	5	5
180	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6



THD and PF Test

Model No.	IK-RT14F-202530-CCT-D (3500K 30W)	Sample ID.	5044126
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.4	119.96	60	0.2458	29.16	0.9890	12.45%	Horizontal
24.4	277.07	60	0.1093	29.32	0.9592	8.46%	Horizontal



THD and PF Test

Model No.	IK-RT14F-202530-CCT-D (4000K 30W)		Sample ID.	5044126
Operate time (Min.)	90	Stabilization time (Min.)	45	

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
 2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.4	119.95	60	0.2371	28.13	0.9892	12.18%	Horizontal
24.4	277.05	60	0.1060	28.40	0.9671	8.54%	Horizontal



THD and PF Test

Model No.	IK-RT14F-202530-CCT-D (5000K 30W)	Sample ID.	5044126
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.4	119.95	60	0.2458	29.16	0.9890	12.45%	Horizontal
24.4	277.08	60	0.1091	29.30	0.9602	8.48%	Horizontal



THD and PF Test

Model No.	IK-RT14F-202530-CCT-D (3500K 25W)	Sample ID.	5044126
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
 2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.4	119.99	60	0.2016	23.86	0.9856	13.77%	Horizontal
24.4	277.07	60	0.0939	24.87	0.9565	9.96%	Horizontal



THD and PF Test

Model No.	IK-RT14F-202530-CCT-D (3500K 20W)		Sample ID.	5044126
Operate time (Min.)	90	Stabilization time (Min.)	45	

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
 2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.4	120.00	60	0.1636	19.26	0.9812	15.10%	Horizontal
24.4	277.09	60	0.0810	21.09	0.9401	11.70%	Horizontal



In-Situ Temperature Measurement Test

Model No.	IK-RT14F-202530-CCT-D (3500K 30W)	Sample ID.	5044126
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Test Method

1. In-Situ Temperature Measurement Test is conducted according to the UL 1598-2008, Section 14.
 2. The testing was conducted in a room with ambient temperature of 25 °C ± 5 °C. The apparatus construction followed those described in UL1598-2008 for normal temperature testing. Thermocouples were placed on the LED package in the locations indicated by LM-80 report. Thermocouples were placed on the LED driver case in the locations specified by the manufacture if necessary. The temperature was recorded after the lamp was operated by 7.5 hours.
 3. The data and photos in LM-80 test report is provided by the customer/ The data and photos in driver specification is provided by the customer.

In-Situ Temperature Measurement Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
23.0	119.96	60	0.2458	29.163	0.9890	12.45%	Horizontal

Test Results (LEDs)

Thermocouple Location	Declared Light Source Current (mA)	Temperature for Light Source (°C)		Max Chromaticity Shift (1000-6000h)	LED Model Number	LM-80 Limit Current (mA)	LM-80 Limit Temp (°C)
		Test Result	Test Result (Correct to 25 °C)				
Ambient TEMP	N/A	23.0	25.0				
TMP of Location 1	110	37.7	39.7	0.0024	STW8A2PD-XX	200	105

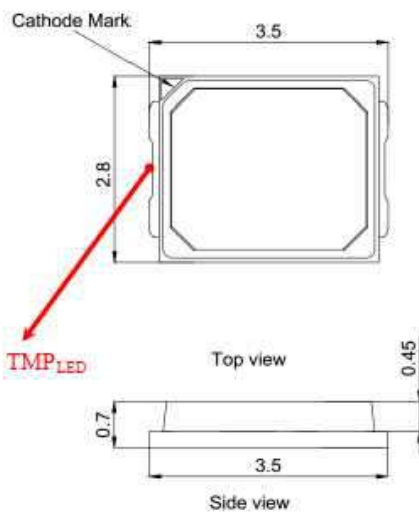
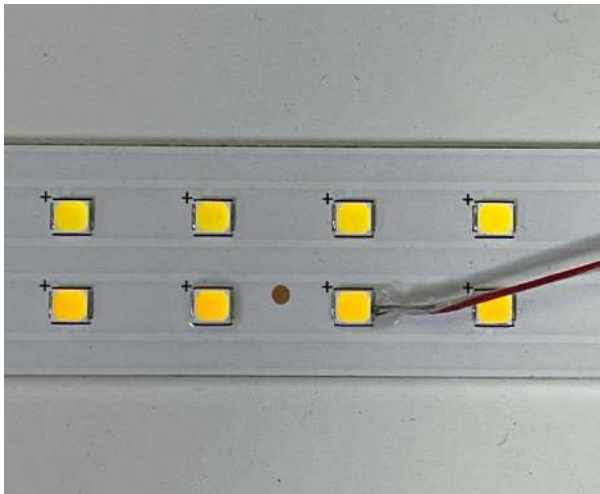
Test Results (Drivers)

Thermocouple Location	Temperature for Driver (°C)		Driver Model Number	Driver Limit Temp (°C)
	Test Result	Test Result (Correct to 25 °C)		
Ambient TEMP	23.0	25.0		
TMP of Location 1	50.5	52.5	SIF 30-I0650 120-277 W D1-S1S2	90



In-Situ Temperature Measurement Test (Cont'd)

Test Photos for Ts Point of Light Sources & Tc Point of Drivers





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