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Total pages	21

Test report of
IES LM-79-08
Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Applicant:

IKIO LED LIGHTING

Address:

8470 Allison Pointe Blvd, Suite 128 Indianapolis, IN 46250

For Product:

Architectural Flood and Spot Luminaires

Model No.:

IK-SLEL2-0400-D-30 / IK-SLEL2-0400-D-57

Test laboratory: Shenzhen Belling Efficiency Testing Lab Co.,Ltd, 1Floor, No.1 Building, Meibaohe Industrial Park, Dalang Street, Longhua District, Shenzhen, Guangdong Prov.518101 China.

Jarvis zhang

Jason zhou

Complied by: Jarvis zhang **Review by: Jason zhou**

Project Engineer **Technical Manager**

Note: The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or use in part without prior written consent from Shenzhen Belling Efficiency Testing Lab Co.,Ltd. This report must not be used by the customer to claim product certification, approval, or endorsement By NVLAP, NIST, or any agency of the U.S. Government.

1 General

1.1 Product Information

Manufacturer	IKIO LED LIGHTING
Manufacturer Address	8470 Allison Pointe Blvd, Suite 128 Indianapolis, IN 46250
Brand Name	IKIO
Luminaire Type	Architectural Flood and Spot Luminaires
Model Number	IK-SLEL2-0400-D-30 / IK-SLEL2-0400-D-57
Rated Inputs	AC 100-277V, 50/60Hz
Rated Power	400 W
Nominal CCT	3000K / 5700K
Dimming Capability	Continuous
Integral Controls	No
Date of Receipt Samples	2020-05-29
Date of test	2020-06-01 to 2020-06-19
Burning Time Before Test	0hour(For New Products)

1.2 Standards or methods

- ANSI C78.377-2017:Specifications for the Chromaticity of Solid State Lighting Products
- ANSI C82.77-10:2014:Harmonic Emission Limits - Related Power Quality Requirements for Lighting Equipment - Solid State
- CIE Publication No.13.3-1995:Method of Measuring and Specifying Color Rendering of Light Sources
- IESNA LM-79-08 Approved Method: Electric & Photometric Measurement of Solid-state Lighting Products

1.3 Equipment list

Device	Manufacture	Model No.	Serial No.	Calibration due date
Goniophotometric System	SENSING	GMS-3000	N.A	2021-04-02
AC Power Source	ALL POWER	APW-110N	992257	2021-04-02
Total Luminous Flux Standard Lamp	SENSING	110V/100W	S1510065	2021-04-08
Total Spectral Radiant Flux Standard Lamp	SENSING	12V/20W	LSD12201731	2021-04-08
Digital Power Meter	YOKOGAWA	WT310	C2QM02030V	2021-04-02
Integral Sphere	SENSING	SPR-600M	N.A	2021-04-02
Digital Power Meter	YOKOGAWA	WT210	91L929742	2021-04-02
Optical Color and Electrical Measurement System	SENSING	SPR-3000	S1101108	2021-04-02
Environment Measurer	XUYAO	HS-1	N/A	2021-04-08
Environment Measurer	XUYAO	HS-1	N/A	2021-04-08
Stop watch	KISLO	K610	N/A	2021-04-27
Digital Anemometer	TECMAN	TD8901	026141	2020-09-10

Statement of Traceability: Shenzhen Belling Efficiency Testing Lab Co.,Ltd attests that all calibration has been performed using suitable standards traceable to national primary standards and International System of Unit (SI).

2 Test conducted and method

2.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at 25°C ±1°C, the air flow around the sample(s) being tested did not affect the performance.

2.2 Power Supply Characteristics

The AC power supply had a sinusoidal voltage wave shape at the prescribed frequency (60 Hz) such that the RMS summation of the harmonic components does not exceed 3 percent of the fundamental during operation of the test item.

The voltage of AC power supply (RMS voltage) applied to the device under test was regulated to within±0.2 percent under load.

2.3 Seasoning and Stabilization

No seasoning was performed in accordance with IESNA LM-79-08. And before the measurement, the sample was stabilized until the light output and power variations were less than 0.5% in 30 minutes intervals (3 readings, 15 minutes apart).

2.4 Integrating Sphere System

The system includes AC power source, digital power meter, DC power supply, spectrophotometer, and integrating sphere. The integrating sphere system is calibrated by standard light source before measurement. The system and standard light source has been calibrated regularly and traceable to the National Primary Standards. 4π geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

Integrating Sphere Uncertainty: The uncertainty of the light output (luminous flux) measurements is U=1.8% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=20K (K=2), at the 95% confidence level. The uncertainty of the CRI is U=1.8(K=2), at the 95% confidence level. The uncertainty of power meter AC current U=0.18% of rdg, AC Voltage U=0.16% of rdg, Power U=0.20% (K=2), at the 95% confidence level.

2.5 Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement. The standard light source has been calibrated regularly and traceable to the National Primary Standards.

Type C goniophotometer was used for measuring total luminous flux, luminous intensity distribution, and color spatial uniformity. The product was operated in its intended orientation in application and was recorded in this report. The method according to IESNA LM-79-08 following chapter.

Goniophotometer Uncertainty :The uncertainty of the luminous intensity is U=1.6% (K=2), at the 95% confidence level.

3 Test Result Summary

3.1 Integrating Sphere System (Total operating time for integrating sphere test: 1.0 hour)

3.1.1 Model Number: IK-SLEL2-0400-D-30

Electrical data

Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.07	60	3.327	398.33	0.997

Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)	CRI	Rf	Rg	Rcs,h1(%)
61183.49	153.6	3014	73.7	75	96	-15

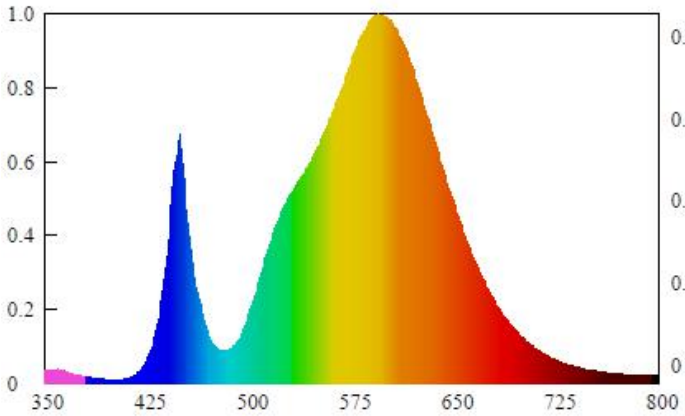
Chromaticity Coordinate

Duv	x	y	u'	v'
-0.00106	0.4344	0.4006	0.2505	0.5196

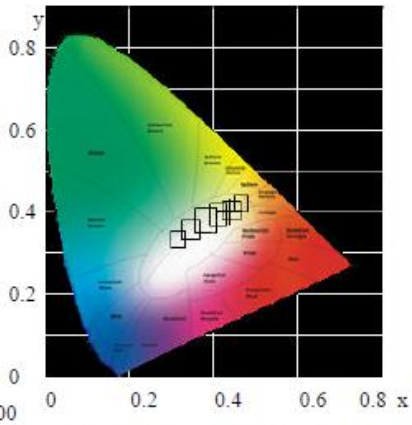
Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
71	83	93	71	70	76	79	48
R9	R10	R11	R12	R13	R14	R15	-
-22	60	66	50	74	96	64	-

Spectral Distribution



Spectral Distribution

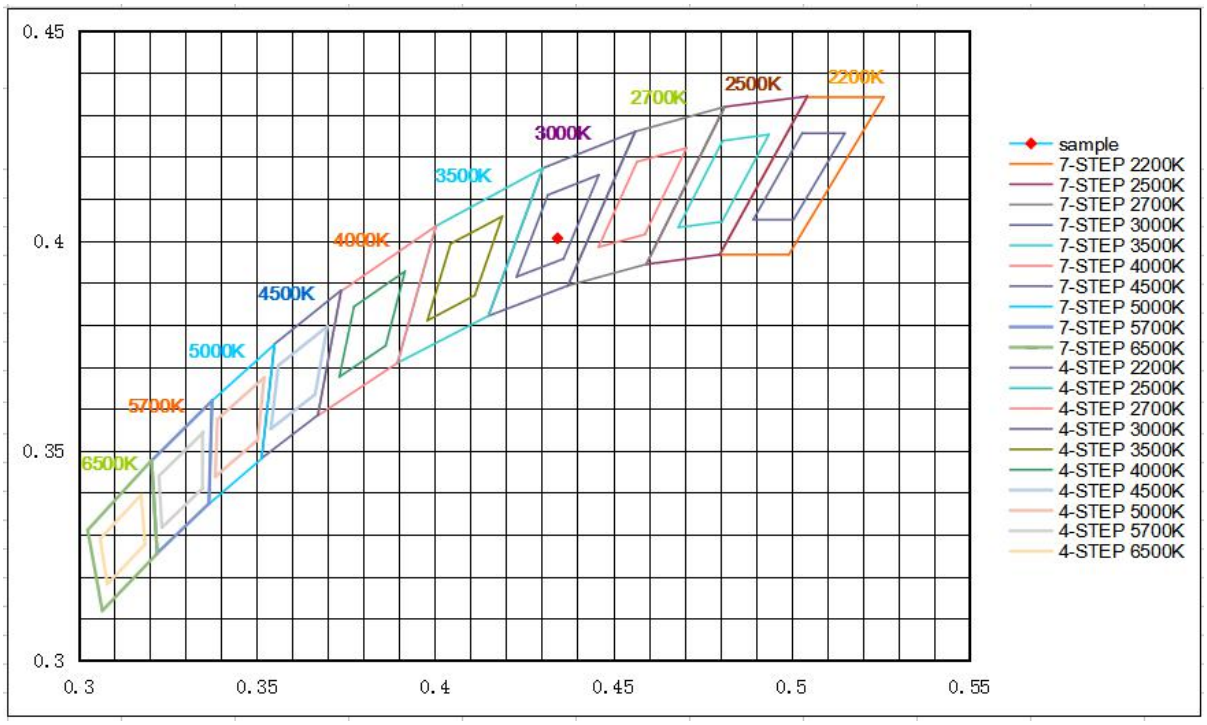


CIE1931 Chromaticity Diagram

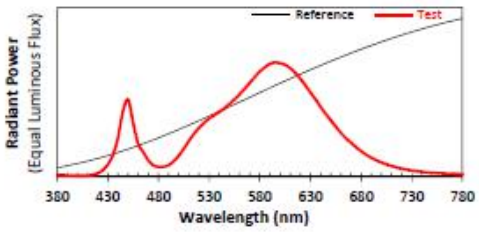
Spectral Energy Distribution

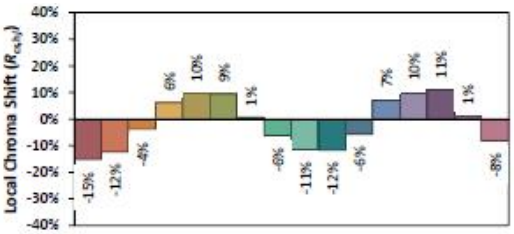
WL(nm)	Spectrum	WL(nm)	Spectrum
380	8.06E-02	585	4.283876
385	6.81E-02	590	4.420703
390	5.85E-02	595	4.469171
395	4.80E-02	600	4.438258
400	4.23E-02	605	4.381318
405	4.17E-02	610	4.243177
410	5.15E-02	615	4.065222
415	7.64E-02	620	3.839033
420	0.1430038	625	3.576721
425	0.2651031	630	3.29858
430	0.4912756	635	3.035342
435	0.8569789	640	2.738439
440	1.533771	645	2.465304
445	2.586438	650	2.209422
450	3.016615	655	1.966285
455	2.10452	660	1.725816
460	1.281961	665	1.512969
465	0.9594417	670	1.332085
470	0.6389003	675	1.162406
475	0.4478724	680	0.9991045
480	0.3933572	685	0.8651698
485	0.3979314	690	0.7533355
490	0.4587517	695	0.6514981
495	0.6052137	700	0.5638654
500	0.8387221	705	0.4893509
505	1.102357	710	0.4213097
510	1.407767	715	0.367374
515	1.673863	720	0.3237538
520	1.919897	725	0.2835783
525	2.117	730	0.247377
530	2.268785	735	0.2213275
535	2.406742	740	0.1962688
540	2.540305	745	0.1751307
545	2.678637	750	0.1578099
550	2.849489	755	0.1445999
555	3.033616	760	0.1330442
560	3.226088	765	0.1229627
565	3.438946	770	0.1154078
570	3.667271	775	0.1081383
575	3.908297	780	0.1024531
580	4.122867		

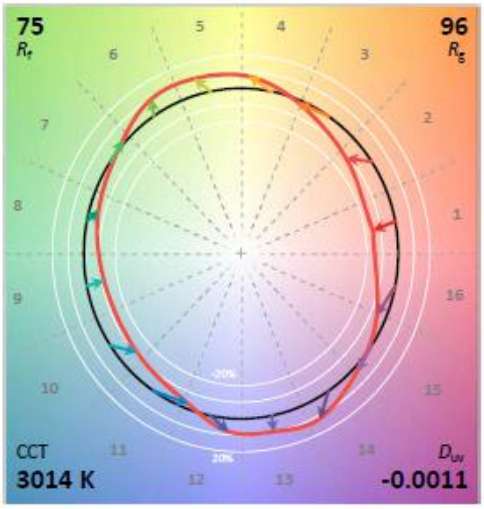
7/4 Step Quadrangle

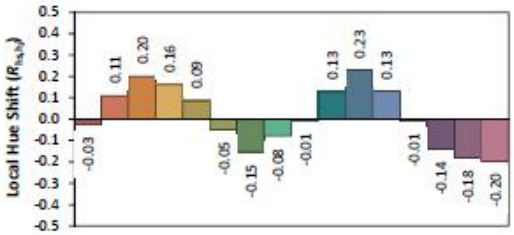


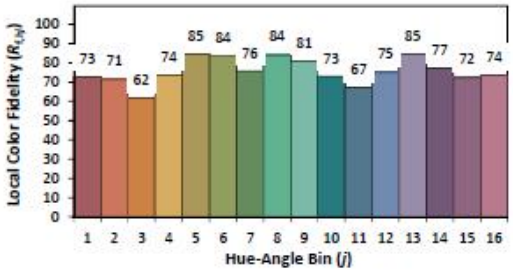
ANSI/IES TM-30-18 Color Rendition Report

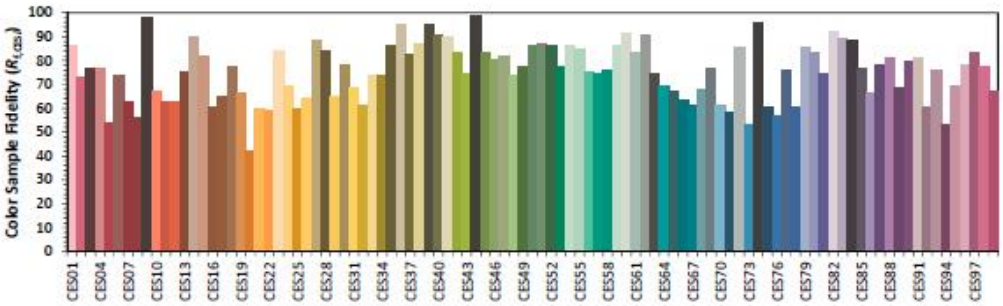












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.4344
y	0.4006
u'	0.2505
v'	0.5196

CIE 13.3-1995 (CRI)	
R_a	74
R_9	-23

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

3.1.2 Model Number: IK-SLEL2-0400-D-57

Electrical data

Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
119.99	60	3.346	399.93	0.996

Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)	CRI	Rf	Rg	Rcs,h1(%)
63548.88	158.9	5696	73.6	74	94	-17

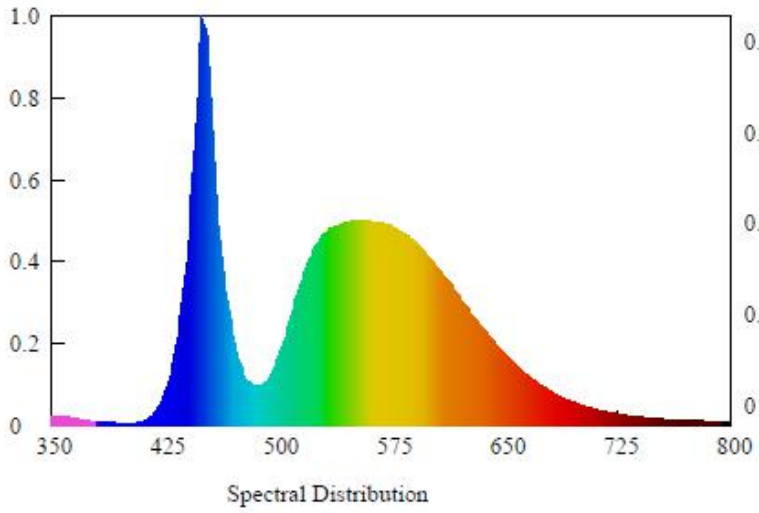
Chromaticity Coordinate

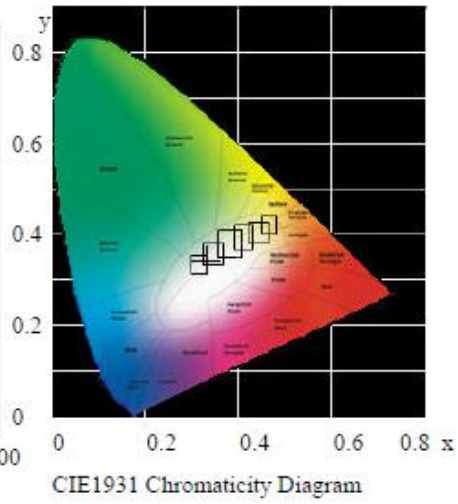
Duv	x	y	u'	v'
+0.00241	0.3281	0.3419	0.2036	0.4773

Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
72	78	80	74	71	68	83	62
R9	R10	R11	R12	R13	R14	R15	-
-19	45	70	38	74	88	68	-

Spectral Distribution

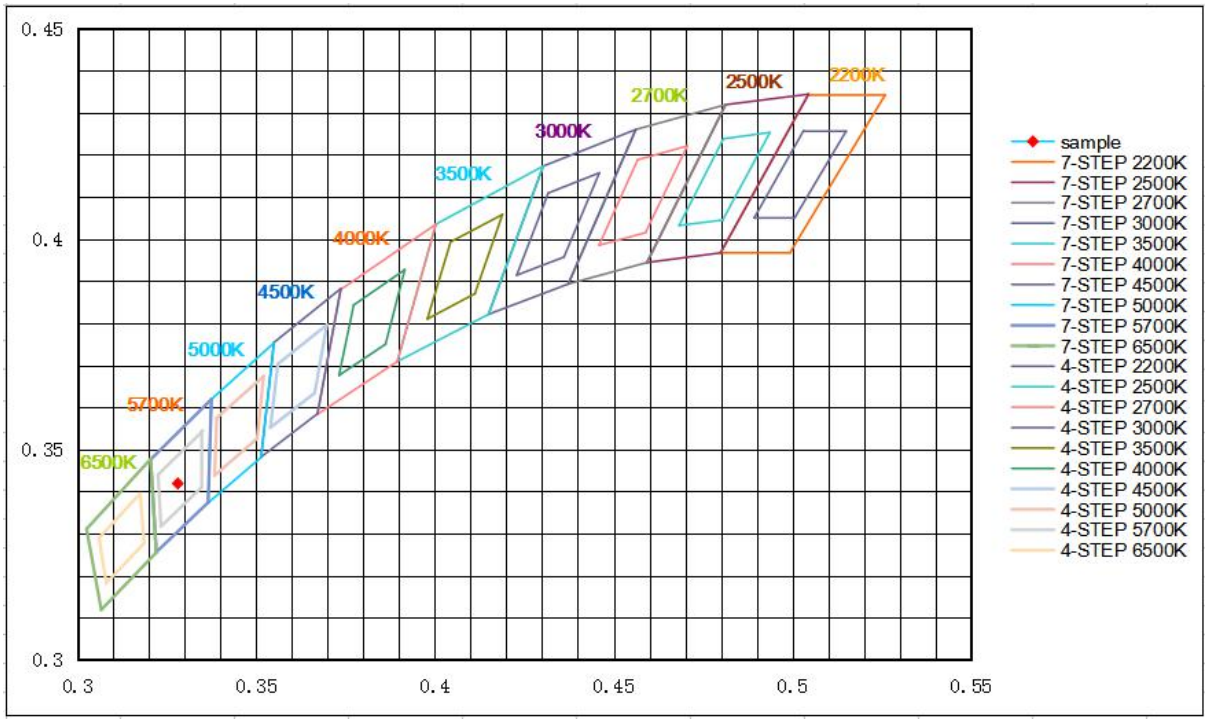




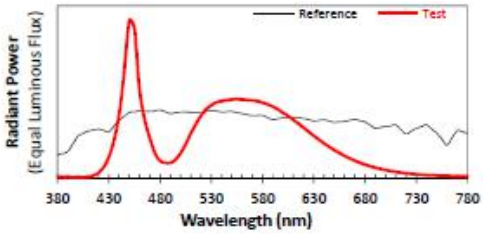
Spectral Energy Distribution

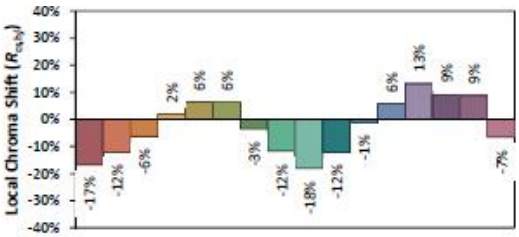
WL(nm)	Spectrum	WL(nm)	Spectrum
380	6.99E-02	585	3.364597
385	5.86E-02	590	3.264064
390	4.80E-02	595	3.143712
395	4.09E-02	600	2.981638
400	3.61E-02	605	2.838354
405	3.87E-02	610	2.656739
410	6.05E-02	615	2.494306
415	0.1151955	620	2.308657
420	0.2550913	625	2.117507
425	0.5041578	630	1.935302
430	0.9555362	635	1.76716
435	1.691734	640	1.586896
440	2.866339	645	1.429453
445	4.810246	650	1.287229
450	7.182211	655	1.15365
455	6.85055	660	1.02126
460	4.06012	665	0.9050797
465	2.691789	670	0.802687
470	1.847492	675	0.7127811
475	1.155271	680	0.6220692
480	0.7960299	685	0.5452067
485	0.7035083	690	0.4825414
490	0.7000636	695	0.4243138
495	0.8327915	700	0.3730602
500	1.138302	705	0.3290267
505	1.542325	710	0.2880665
510	2.033837	715	0.2552607
515	2.457546	720	0.2294122
520	2.84989	725	0.204126
525	3.136981	730	0.1810405
530	3.326098	735	0.1633447
535	3.459007	740	0.147094
540	3.511617	745	0.1332176
545	3.553518	750	0.1221819
550	3.58772	755	0.1121733
555	3.608807	760	0.103897
560	3.587133	765	9.73E-02
565	3.570961	770	9.02E-02
570	3.550108	775	8.69E-02
575	3.515424	780	8.15E-02
580	3.443797		

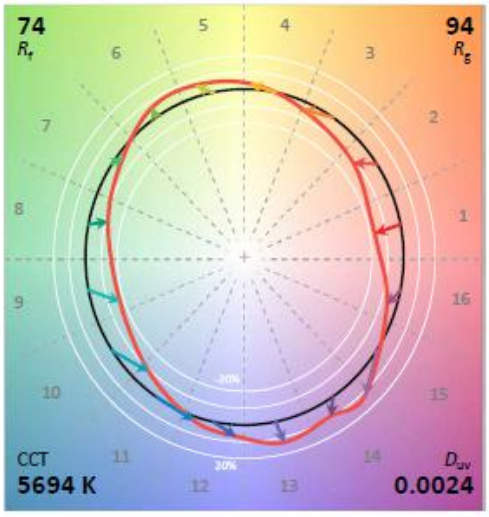
7/4 Step Quadrangle

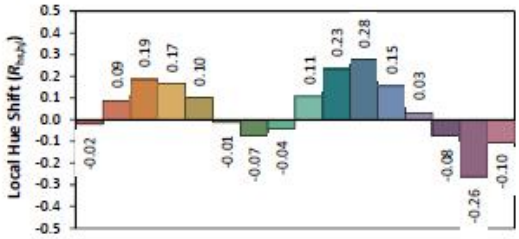


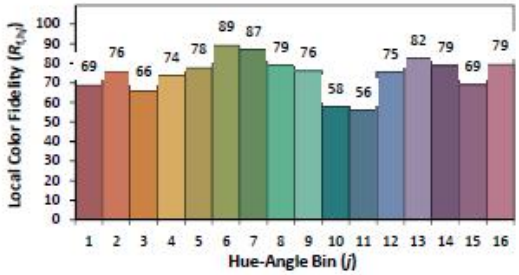
ANSI/IES TM-30-18 Color Rendition Report

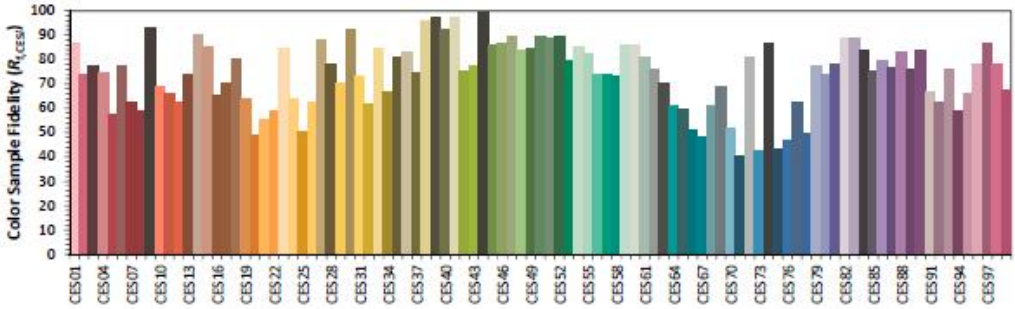












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3281
y	0.3419
u'	0.2036
v'	0.4773

CIE 13.3-1995 (CRI)

R_a	74
R_9	-20

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

3.2 Goniophotometer System(Total operating time for luminous intensity distribution: 1.0 hour)

3.2.1 Model Number: IK-SLEL2-0400-D-30

Electrical data

Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.18	60	3.3320	399.66	0.998

Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 0-90°(%lm)
61171.19	153.06	99.88

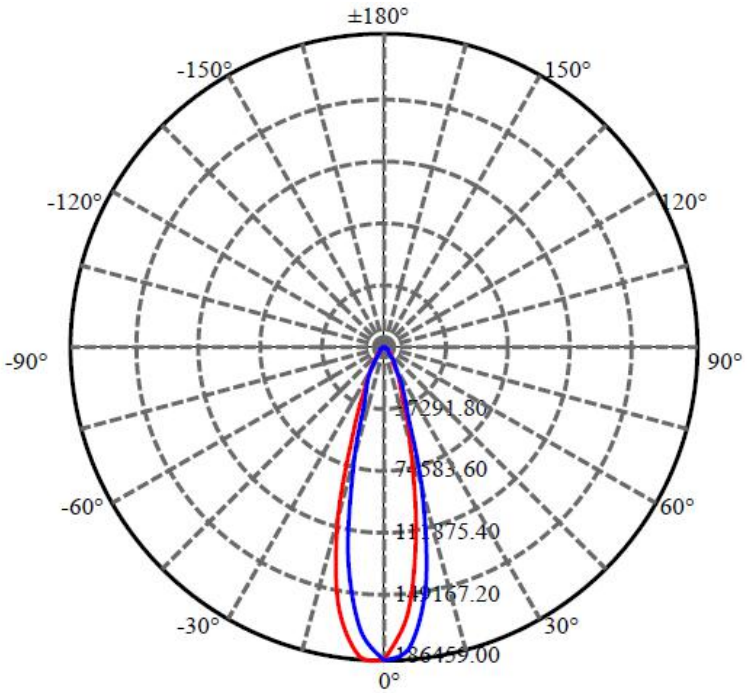
Zonal Flux Diagram

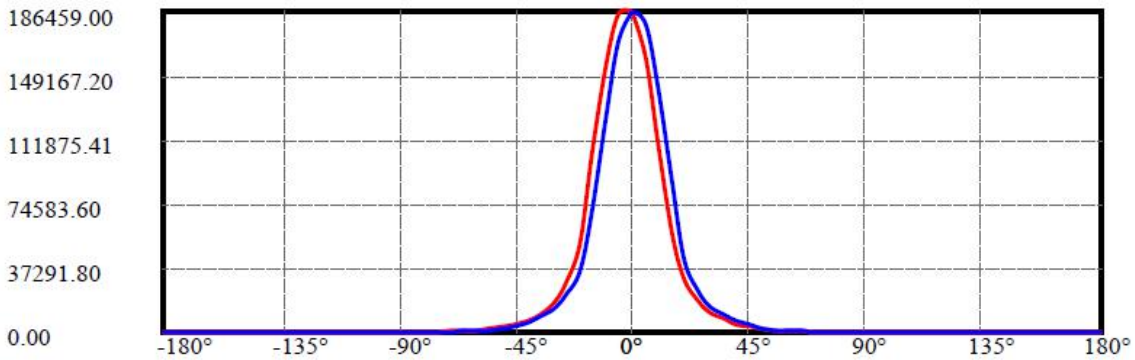
Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	186459.000	0.000	0	0.00%	0.00%
5.0	171537.781	4279.749	4279.749	0.00%	7.00%
10.0	132729.094	10884.584	15164.333	0.00%	24.79%
15.0	80229.164	12632.540	27796.874	0.00%	45.44%
20.0	40925.969	9984.885	37781.759	0.00%	61.76%
25.0	23347.779	6741.130	44522.888	0.00%	72.78%
30.0	14311.126	4765.766	49288.654	0.00%	80.57%
35.0	9106.820	3448.457	52737.11	0.00%	86.21%
40.0	6099.142	2537.000	55274.11	0.00%	90.36%
45.0	3935.900	1858.069	57132.18	0.00%	93.40%
50.0	2465.279	1293.452	58425.631	0.00%	95.51%
55.0	1585.269	880.724	59306.355	0.00%	96.95%
60.0	1075.315	614.986	59921.342	0.00%	97.96%
65.0	756.778	445.385	60366.727	0.00%	98.68%
70.0	522.412	323.899	60690.626	0.00%	99.21%
75.0	323.363	221.072	60911.698	0.00%	99.58%
80.0	151.572	127.079	61038.777	0.00%	99.78%
85.0	34.132	50.460	61089.237	0.00%	99.87%
90.0	0.824	9.571	61098.809	0.00%	99.88%
95.0	0.515	0.367	61099.175	0.00%	99.88%
100.0	0.515	0.280	61099.455	0.00%	99.88%
105.0	0.618	0.303	61099.758	0.00%	99.88%
110.0	0.888	0.394	61100.152	0.00%	99.88%
115.0	1.429	0.587	61100.739	0.00%	99.88%
120.0	2.111	0.860	61101.599	0.00%	99.89%
125.0	3.179	1.223	61102.822	0.00%	99.89%
130.0	4.801	1.735	61104.557	0.00%	99.89%
135.0	7.388	2.463	61107.02	0.00%	99.90%
140.0	11.879	3.567	61110.587	0.00%	99.90%
145.0	19.871	5.297	61115.884	0.00%	99.91%
150.0	32.549	7.719	61123.603	0.00%	99.92%
155.0	47.568	10.139	61133.742	0.00%	99.94%
160.0	61.172	11.405	61145.147	0.00%	99.96%
165.0	69.666	10.783	61155.93	0.00%	99.98%
170.0	71.957	8.401	61164.331	0.00%	99.99%
175.0	71.494	5.132	61169.463	0.00%	100.00%
180.0	72.945	1.727	61171.189	0.00%	100.00%

Luminous Intensity Distribution Diagram

Light Distribution Curve [Unit:cd]





C0/C180:

C90/C270:

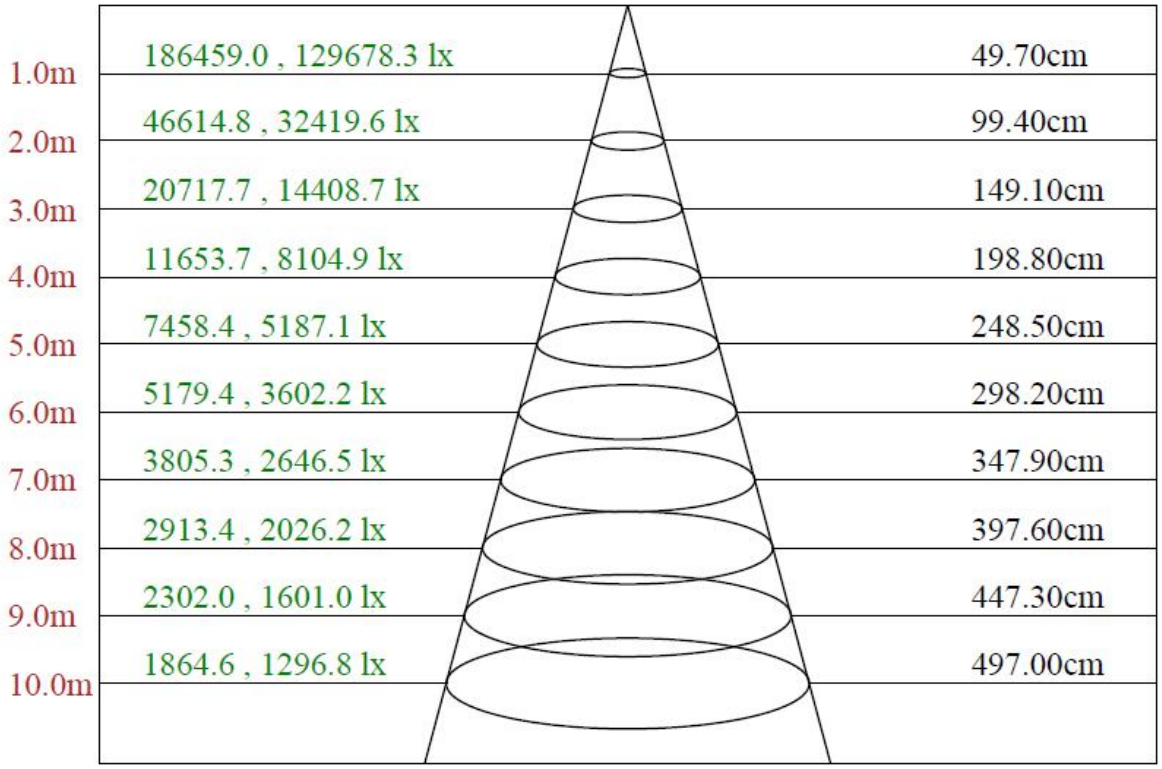
Field angle(10%Imax):C0/180Left:29.3 Right:24.9

:C90/270Left:26.8 Right:28.1

Beam Angle(50%Imax):C0/180Left:16.1 Right:11.6

:C90/270Left:12.9 Right:14.5

Lux distance Curve



Max , Ave Beam angle of C0 plane 27.91

Luminous Intensity Distribution Data

C/γ(°)	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
0.0	186459.00	158528.59	109889.70	57750.15	30889.00	18517.17	11715.55	7650.64	5014.83
22.5	186459.00	156531.20	106595.00	55031.97	30207.39	18049.73	11233.69	7364.41	4903.63
45.0	186459.00	156469.41	107604.00	52993.34	29680.23	17779.97	10994.82	7335.58	4872.75
67.5	186459.00	156716.50	109642.60	54867.23	29702.88	17909.70	11122.49	7343.81	4876.86
90.0	186459.00	178461.91	141993.00	87526.54	42532.47	24699.58	14815.30	9955.53	6460.41
112.5	186459.00	179141.50	144978.91	91377.30	43582.68	25132.02	15371.29	9955.53	6656.03
135.0	186459.00	181138.91	147388.20	96587.13	46506.77	26244.00	16071.43	10017.31	6759.00
157.5	186459.00	183115.80	151506.70	100190.80	49801.54	27561.90	16503.87	9976.12	6966.98
180.0	186459.00	183898.30	154616.09	104515.10	51716.61	28591.52	17039.27	10285.01	7098.77
202.5	186459.00	184577.80	156510.59	106903.90	53775.84	28859.22	17698.22	10593.89	7168.78
225.0	186459.00	184166.00	156119.30	106739.10	54146.50	29250.47	17348.15	10696.85	7292.33
247.5	186459.00	184042.41	155995.80	106409.60	55608.55	28879.81	17595.26	10902.77	7432.36
270.0	186459.00	168330.50	125539.80	70311.42	36354.18	21503.05	13402.05	8694.67	5717.03
292.5	186459.00	166086.00	121833.20	68519.89	34525.59	20971.77	13128.18	8663.78	5679.96
315.0	186459.00	163306.00	119073.90	64133.75	33440.38	20446.66	12790.46	8338.42	5445.21
337.5	186459.00	160093.59	114378.80	59809.38	32344.87	19167.89	12147.99	7934.81	5241.35
360.0	186459.00	158528.59	109889.70	57750.15	30889.00	18517.17	11715.55	7650.64	5014.83

C/γ(°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	3218.57	2010.42	1315.02	906.47	649.89	433.26	242.78	84.84	1.85
22.5	3063.51	1914.46	1263.95	889.17	634.24	422.35	228.99	79.69	1.24
45.0	2965.28	1853.30	1256.95	882.38	624.36	416.58	227.54	75.57	1.24
67.5	2974.55	1854.74	1253.66	872.70	625.39	413.29	227.75	75.78	1.03
90.0	4069.65	2446.98	1610.93	1104.36	768.09	536.84	338.95	161.65	35.21
112.5	4217.91	2521.11	1625.35	1131.13	782.30	542.40	350.07	174.83	41.60
135.0	4355.88	2650.84	1711.83	1164.08	816.28	566.29	369.84	183.89	50.66
157.5	4578.28	2776.45	1763.31	1209.38	842.22	600.47	387.55	200.57	58.07
180.0	4763.61	2943.25	1823.03	1236.15	865.29	605.62	402.99	216.63	69.40
202.5	4788.32	3134.76	1905.40	1258.80	883.41	629.30	409.17	228.16	77.63
225.0	4833.62	3112.11	1963.06	1279.40	890.62	634.65	420.70	236.81	83.19
247.5	4817.15	3145.06	1981.59	1291.75	896.38	630.54	423.58	237.22	80.52
270.0	3764.26	2391.79	1553.89	1034.56	743.17	509.45	313.21	136.12	18.12
292.5	3676.75	2328.98	1516.83	1019.93	720.94	497.72	299.62	126.44	13.59
315.0	3563.49	2245.17	1448.67	980.19	701.17	474.65	278.41	110.17	9.27
337.5	3323.59	2115.03	1370.83	944.57	664.72	445.20	252.67	96.78	3.50
360.0	3218.57	2010.42	1315.02	906.47	649.89	433.26	242.78	84.84	1.85

C/γ(°)	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	0.62	0.62	0.41	0.62	1.24	1.65	2.47	3.91	5.77
22.5	0.82	0.62	0.62	0.82	1.44	1.85	2.88	4.12	5.97
45.0	0.82	0.82	0.41	0.82	1.24	1.65	2.68	3.91	6.18
67.5	0.62	0.62	0.62	0.82	1.03	1.85	2.68	4.12	6.18
90.0	0.41	0.41	0.41	0.41	0.62	1.44	1.85	2.88	4.32
112.5	0.41	0.41	0.41	0.41	0.62	1.24	1.65	2.88	4.53
135.0	0.82	0.41	0.41	0.21	1.03	1.24	1.85	2.47	4.12
157.5	0.82	0.41	0.41	0.62	0.82	1.03	1.44	2.68	3.91
180.0	1.03	0.41	0.62	0.41	0.62	1.24	1.65	2.27	3.71
202.5	1.03	0.41	0.41	0.41	0.62	0.82	1.65	2.27	3.50
225.0	1.24	0.21	0.41	0.41	0.41	1.03	1.44	2.47	3.71
247.5	1.24	0.41	0.41	0.41	0.41	1.03	1.65	2.27	3.50
270.0	0.82	0.62	0.82	1.03	1.24	1.85	2.68	3.50	5.35
292.5	0.82	0.82	0.62	0.82	0.82	1.65	2.27	3.71	5.35
315.0	0.82	0.62	0.62	0.62	1.03	1.65	2.47	3.50	5.35
337.5	0.82	0.41	0.62	1.03	1.03	1.65	2.47	3.91	5.35
360.0	0.62	0.62	0.41	0.62	1.24	1.65	2.47	3.91	5.77

C/γ(°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	9.06	14.62	25.12	39.54	55.81	68.57	73.93	72.69	72.49
22.5	9.27	15.24	25.33	39.95	56.01	67.75	73.51	71.87	72.07
45.0	9.06	15.03	25.33	40.16	55.19	67.13	72.69	71.87	72.28
67.5	9.27	14.83	25.33	39.13	53.54	65.48	71.25	71.46	72.28
90.0	6.59	10.50	17.50	29.45	44.27	58.28	67.34	71.46	69.19
112.5	6.59	10.30	17.30	29.24	43.66	57.86	67.95	71.66	70.22
135.0	6.38	10.09	16.89	28.21	43.66	57.66	68.57	72.69	70.84
157.5	5.97	9.47	15.86	27.39	42.42	57.66	68.37	72.90	71.04
180.0	5.77	9.27	15.03	26.56	41.19	56.63	67.75	72.28	71.04
202.5	5.56	8.86	14.62	25.53	39.95	54.98	66.31	71.04	70.01
225.0	5.56	8.65	14.42	24.92	39.33	54.36	64.87	70.22	69.60
247.5	5.35	8.86	14.62	24.71	38.51	53.13	64.25	69.81	69.40
270.0	8.03	12.97	21.42	35.01	50.04	63.01	71.46	72.90	73.72
292.5	8.44	13.18	22.24	35.21	50.66	63.84	71.25	73.10	74.13
315.0	8.65	13.80	22.86	37.07	52.72	65.07	72.07	72.69	73.10
337.5	8.65	14.42	24.09	38.71	54.16	67.34	73.10	72.69	72.49
360.0	9.06	14.62	25.12	39.54	55.81	68.57	73.93	72.69	72.49

C/γ(°)	180.0
0.0	72.95
22.5	72.95
45.0	72.95
67.5	72.95
90.0	72.95
112.5	72.95
135.0	72.95
157.5	72.95
180.0	72.95
202.5	72.95
225.0	72.95
247.5	72.95
270.0	72.95
292.5	72.95
315.0	72.95
337.5	72.95
360.0	72.95

4 Additional Test

Electrical data at 120V, 277V

Model Number	Test Item	Test Voltage (V)	Frequency(Hz)	Test Result
IK-SLEL2-0400-D-30	Power Factor	120	60	0.997
	THD	120	60	7.2%
	Power Factor	277	60	0.951
	THD	277	60	10.50%
IK-SLEL2-0400-D-57	Power Factor	120	60	0.996
	THD	120	60	6.6%
	Power Factor	277	60	0.967
	THD	277	60	9.5%

5 Performance Assessment

Model name	CCT(K)	Total Luminous(lm)	Power(W)	Luminous Efficacy(lm/W)
IK-SLEL2-0400-D-30	3000K	61183.49	398.33	153.6
IK-SLEL2-0400-D-35	3500K	61656.57 *1	399.13 *2	154.5 *3
IK-SLEL2-0400-D-40	4000K	62129.65 *1	399.13 *2	155.7 *3
IK-SLEL2-0400-D-45	4500K	62602.72 *1	399.13 *2	156.8 *3
IK-SLEL2-0400-D-50	5000K	63075.80 *1	399.13 *2	158.0 *3
IK-SLEL2-0400-D-57	5700K	63548.88	399.93	158.9

*1: This value is calculated and the calculation formula is as below:

61656.57=(63548.88-61183.49) /5+61183.49

62129.65=(63548.88-61183.49) /5+61656.57

62602.72=(63548.88-61183.49) /5+62129.65

63075.80=(63548.88-61183.49) /5+62602.72

*2: This value is calculated and the calculation formula is as below:

399.13=(398.33+399.93)/2

*3: This value is calculated and the calcuation formula is as below:

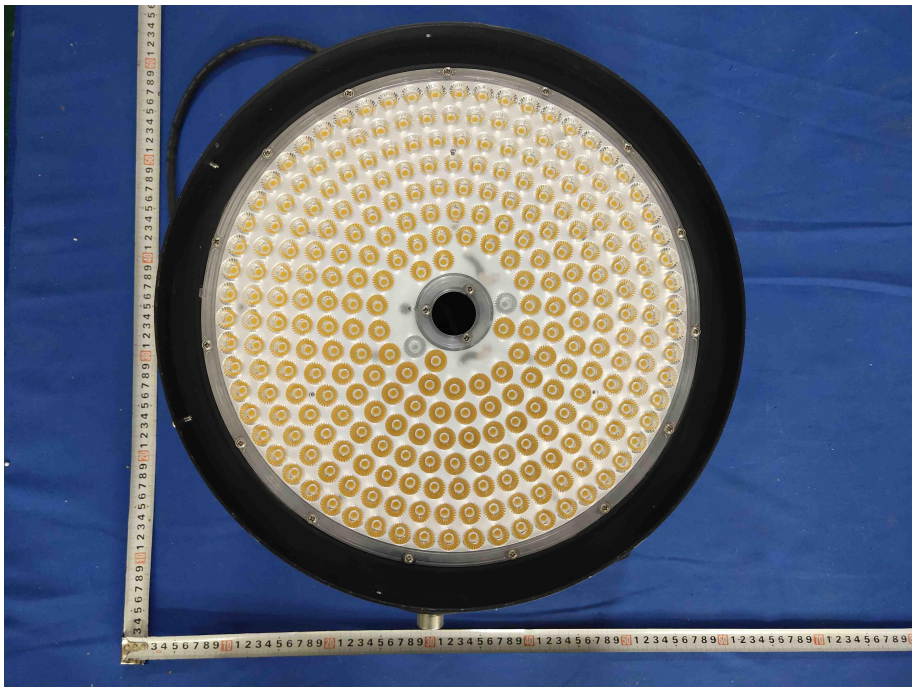
154.5=61656.57 /399.13

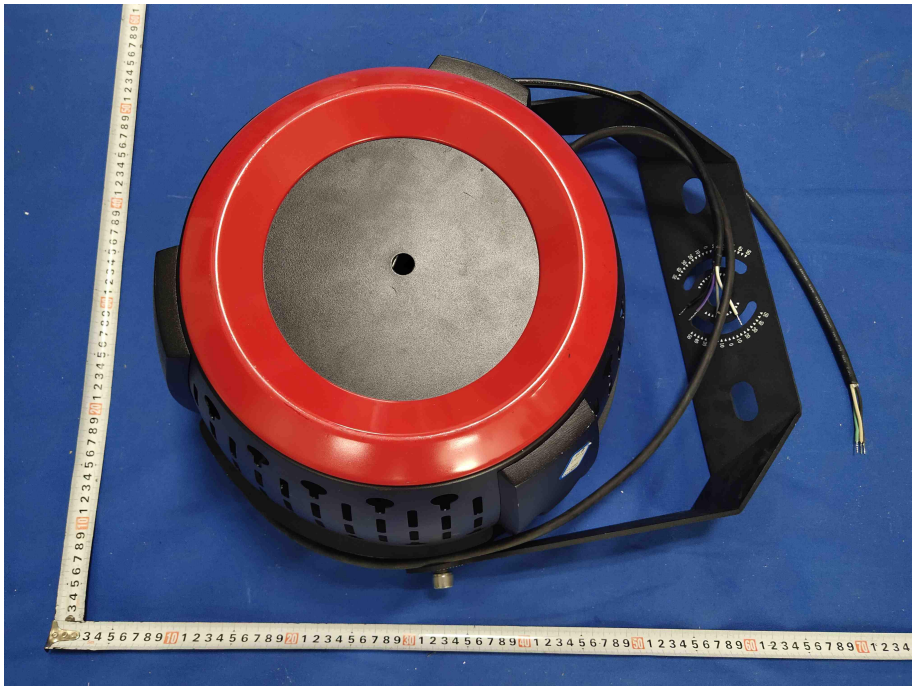
155.7=62129.65 /399.13

156.8=62602.72 /399.13

158.0=63075.80 /399.13

Photo Document





****End of test report****