Test Report

Report number: KYR240506036-TRA0

Product name: LED lamp

Size of product: P10038(BR40-11-9CCT-DIM)

Client: Technical Department

Brand name: RAB

Statement

1. To The inspection agencies ensure the impartiality, independence and integrity of the test data responsible for the commission to provide the Confidentiality and protection of ownership test samples
2. The report ownerless inspection, review, approval and other personnel signature, altered or copied, not stamped seal of the agency test is invalid.
3. The commissioning party disagrees with the report, it is timely to our bodie.
4. The agency received the commission to send samples tested, the test report issued by the inspection data and results of sample submission only responsible forthe authenticity and representativeness of the sample by the commission responsible.
5. Pages of this report are an integral part of the test report, the user singled out some of the pages can lead to misunderstandings or used for other purposes and consequences, the agency pays the corresponding legal responsibility.
6. Test report commissioned by the release and disposal of samples: Principal shall after receiving notification of the completion operations after 30 working days, according to the contract completion inspection reports and sample collection. Overdue Principal will abandon this body, this body on behalf of disposal in accordance with the relevant provisions.
7. The report of the test findings do not prove untested items (functional or performance), compliance with the requirements.

Test Report

Sample Name	LED lamp	Test categories	LM-79
Specifications/level	P10038(BR40-11-9C CT-DIM)	Trademark	RAB
Entrust unit	Technical Department	Entrust unit address	/
Entrust the date	2024.05.06	Date received	2024.05.06
The sample quantity	1	The sample description	Intact appearance
Detection of address	/	Testing environment	25.1℃，60%
Starting test time	2024.05.06	Detection of completion time	2024.05.14
Detection based on	IESNA LM-79-2019 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products		
	Special requirements：		
Test items	/		
Test Conclusion	The test items are qualified.Please refer to Technical Specifications for results. Special seal for test report. Date of issue 2024.05.14		
Note and subcontract information	/		
Opinions and explain	/		

The principal(unit) Communication data	Address	/	Zip code	/
	Mailbox	/	Telephone	/

Photos of the sample

Type: P10038(BR40-11-9CCT-DIM)

Test Equipment List

Serial number	device name	Number	specifications	Calibration Date	Calibration Due date
1	Spectral analysis system	2030070003-008	HAAS-2000	2024/1/4	2025/1/3
2	Precision digital display DC power supply	2020180039-002	WY305	2023/12/25	2024/12/24
3	Intelligent AC test power supply	2020180074-005	DPS1010	2023/12/26	2024/12/25
4	Temperature and humidity meter	2080190001-002	C0S03	2023/12/25	2024/12/24
5	Integrate Sphere system	2030100001-017	（1.5M）	2024/1/4	2025/1/3
6	Electrical parameter measuring instrument	2020090011-018	PF310A	2023/12/26	2024/12/25
7	Intelligent AC test power supply	2020180103-998	DPS1005	2023/12/25	2024/12/24
8	Precision digital display DC power supply	2020180128-001	WY3010	2023/12/25	2024/12/24
9	Electrical parameter measuring instrument	2020090015-999	PF9811	2023/12/25	2024/12/24
10	Calibration lamp	2030030004-029	D204	2024/4/15	2025/4/14
11	Horizontal distribution photometer	2030060006-001	GO-2000	2024/1/4	2025/1/3

Test Summary

Sample Tested: P10038(BR40-11-9CCT-DIM)

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
98.18	1080	11	0.7
CCT (K)	**CRI**	**Stabilization Time (Min)**	
2700/3000/3500/4000/5000	90	85	

Table 1: Executive Data Summary

Note: The above results are recorded/ derived from measurements made using an Integrating Sphere.

Test specifications:

Date of Receipt : May 6, 2024

Date of Test : May 6, 2024

Test item : Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters

Reference Standard : IESNA LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

ANSI/IES TM-30-18 IES Method for Evaluating Light Source Color Rendition

Equipment Under Test (EUT)

Name : LED Lamp

Model : P10038(BR40-11-9CCT-DIM)

Electrical Ratings : 120V, 60Hz, 11.0W

Product Description : E26 base, 2700K/3000K/3500K/4000K/5000K

TEST RESULTS

Test ambient temperature was 25.1℃.

Base orientation was base up. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 85 minutes, and the total operating time including stabilization was 120 minutes.

Sphere-Spectroradiometer Method(2700K)

Parameter	Result
Test Voltage (V)	120.1
Voltage frequency (Hz)	60
Test Current (A)	0.09821
Power Factor	0.8138
Test Power (W)	9.606
Luminous Efficacy (lm/W)	121.09
Total Luminous Flux (lm)	1163.2
Color Rendering Index (CRI)	90.5
R9	58
Correlated Color Temperature (CCT) (K)	2806
Chromaticity (Chroma x, Chroma y)	(0.4534, 0.4123)
Chromaticity (Chroma u, Chroma v)	(0.2576, 0.5270)
Duv	0.00123

Special Color Rendering Indices	
R1	93
R2	92
R3	89
R4	94
R5	90
R6	91
R7	93
R8	84
R9	58
R10	79
R11	93
R12	73
R13	92
R14	92
R15	89

(3000K)

Parameter	Result
Test Voltage (V)	120.2
Voltage frequency (Hz)	60
Test Current (A)	0.09902
Power Factor	0.8229
Test Power (W)	9.794
Luminous Efficacy (lm/W)	124.45
Total Luminous Flux (lm)	1218.9
Color Rendering Index (CRI)	92.9
R9	67
Correlated Color Temperature (CCT) (K)	3050
Chromaticity (Chroma x, Chroma y)	(0.4331, 0.4020)
Chromaticity (Chroma u, Chroma v)	(0.2489, 0.5200)
Duv	-0.000274

Special Color Rendering Indices	
R1	95
R2	94
R3	91
R4	94
R5	95
R6	93
R7	94
R8	88
R9	67
R10	83
R11	94
R12	76
R13	95
R14	93
R15	92

(3500K)

Parameter	Result
Test Voltage (V)	120.2
Voltage frequency (Hz)	60
Test Current (A)	0.09999
Power Factor	0.8363
Test Power (W)	10.05
Luminous Efficacy (lm/W)	128.19
Total Luminous Flux (lm)	1288.6
Color Rendering Index (CRI)	94.9
R9	77
Correlated Color Temperature (CCT) (K)	3456
Chromaticity (Chroma x, Chroma y)	(0.4067, 0.3892)
Chromaticity (Chroma u, Chroma v)	(0.2373, 0.5108)
Duv	-0.00099

Special Color Rendering Indices	
R1	98
R2	96
R3	92
R4	96
R5	96
R6	94
R7	96
R8	92
R9	77
R10	87
R11	95
R12	75
R13	97
R14	94
R15	96

(4000K)

Parameter	Result
Test Voltage (V)	120.2
Voltage frequency (Hz)	60
Test Current (A)	0.1001
Power Factor	0.8382
Test Power (W)	10.08
Luminous Efficacy (lm/W)	128.71
Total Luminous Flux (lm)	1297.8
Color Rendering Index (CRI)	95.7
R9	84
Correlated Color Temperature (CCT) (K)	4062
Chromaticity (Chroma x, Chroma y)	(0.3778, 0.3752)
Chromaticity (Chroma u, Chroma v)	(0.2440, 0.5005)
Duv	0.0000692

Special Color Rendering Indices	
R1	98
R2	96
R3	92
R4	97
R5	96
R6	94
R7	98
R8	95
R9	84
R10	88
R11	95
R12	71
R13	97
R14	94
R15	97

(5000K)

Parameter	Result
Test Voltage (V)	120.1
Voltage frequency (Hz)	60
Test Current (A)	0.09874
Power Factor	0.8195
Test Power (W)	9.719
Luminous Efficacy (lm/W)	123.31
Total Luminous Flux (lm)	1198.5
Color Rendering Index (CRI)	93.8
R9	77
Correlated Color Temperature (CCT) (K)	5137
Chromaticity (Chroma x, Chroma y)	(0.3420, 0.3586)
Chromaticity (Chroma u, Chroma v)	(0.2067, 0.4876)
Duv	0.0047

Special Color Rendering Indices	
R1	95
R2	94
R3	92
R4	95
R5	94
R6	92
R7	97
R8	93
R9	77
R10	84
R11	94
R12	70
R13	94
R14	95
R15	94

Table 2: Test data per Sphere-Spectroradiometer Method

Note: According to CIE 1976 (u',v') diagram, u' = u = 4x/(-2x+12y+3), v' = 3v/2 = 9y/(-2x+12y+3).

Goniophotometer Method

The photometric distance is 9.91m.

Luminous data was taken at 1°vertical intervals and 22.5°horizontal intervals.**(2700K)**

Parameter	Result
Test Voltage (V)	120.113
Voltage frequency (Hz)	60
Test Current (A)	0.0994
Power Factor	0.7883
Test Power (W)	9.4111
Luminous Efficacy (lm/W)	122.91
Total Luminous Flux (lm)	1156.7
Beam Angle (°)	121.5
Max Beam Candle Power (cd)	309.4
Spacing Criteria	121.6(0°-180°)/ 121.5 (90°-270°)
Zonal Lumens in the 0°-60°Zone	62.8%
Zonal Lumens in the 60°-90°Zone	26.1%
Zonal Lumens in the 90°-180°Zone	11.1%

(3000K)

Parameter	Result
Test Voltage (V)	120.113
Voltage frequency (Hz)	60
Test Current (A)	0.1001
Power Factor	0.7968
Test Power (W)	9.5845
Luminous Efficacy (lm/W)	126.25

Total Luminous Flux (lm)	1210
Beam Angle (°)	121.5
Max Beam Candle Power (cd)	323.5
Spacing Criteria	121.6(0°-180°)/ 121.4 (90°-270°)
Zonal Lumens in the 0°-60°Zone	62.8%
Zonal Lumens in the 60°-90°Zone	26.1%
Zonal Lumens in the 90°-180°Zone	11.1%

(3500K)

Parameter	Result
Test Voltage (V)	120.113
Voltage frequency (Hz)	60
Test Current (A)	0.1013
Power Factor	0.8102
Test Power (W)	9.8606
Luminous Efficacy (lm/W)	129.36
Total Luminous Flux (lm)	1275.5
Beam Angle (°)	121.5
Max Beam Candle Power (cd)	340.9
Spacing Criteria	121.6(0°-180°)/ 121.5 (90°-270°)
Zonal Lumens in the 0°-60°Zone	62.8%
Zonal Lumens in the 60°-90°Zone	26.1%
Zonal Lumens in the 90°-180°Zone	11.1%

(4000K)

Parameter	Result
Test Voltage (V)	120.113
Voltage frequency (Hz)	60
Test Current (A)	0.1015
Power Factor	0.8122
Test Power (W)	9.9015
Luminous Efficacy (lm/W)	129.57
Total Luminous Flux (lm)	1283
Beam Angle (°)	121.6
Max Beam Candle Power (cd)	343.1
Spacing Criteria	121.6(0°-180°)/ 121.6 (90°-270°)
Zonal Lumens in the 0°-60°Zone	62.8%
Zonal Lumens in the 60°-90°Zone	26.1%
Zonal Lumens in the 90°-180°Zone	11.1%

(5000K)

Parameter	Result
Test Voltage (V)	120.113
Voltage frequency (Hz)	60
Test Current (A)	0.1001
Power Factor	0.7953

Test Power (W)	9.5595
Luminous Efficacy (lm/W)	124.35
Total Luminous Flux (lm)	1188.8
Beam Angle (°)	121.6
Max Beam Candle Power (cd)	317.7
Spacing Criteria	121.7(0°-180°)/ 121.6 (90°-270°)
Zonal Lumens in the 0°-60°Zone	62.8%
Zonal Lumens in the 60°-90°Zone	26.1%
Zonal Lumens in the 90°-180°Zone	11.1%

Table 3: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method(2700K)

γ(°)	Lumens	% Total
0-30	241.8	20.9
0-40	399.1	34.5
0-60	726.8	62.8
0-90	1029.0	88.9
0-120	1121.0	96.9
0-180	1157.0	100.0
60-90	302.2	26.1
90-120	92.0	8.0
90-130	106.0	9.2
90-150	122.0	10.5
90-180	128.0	11.1

(3000K)

γ(°)	Lumens	% Total
0-30	252.9	20.9
0-40	417.5	34.5
0-60	760.2	62.8
0-90	1076.0	88.9
0-120	1173.0	96.9
0-180	1210.0	100.0
60-90	315.8	26.1
90-120	97.0	8.0
90-130	112.0	9.3
90-150	128.0	10.6
90-180	134.0	11.1

(3500K)

γ(°)	Lumens	% Total
0-30	266.5	20.9
0-40	440.0	34.5
0-60	801.2	62.8
0-90	1134.0	88.9
0-120	1236.0	96.9
0-180	1276.0	100.0
60-90	332.8	26.1
90-120	102.0	8.0
90-130	118.0	9.2
90-150	135.0	10.6
90-180	142.0	11.1

γ(°)	Lumens	% Total

(4000K)

0-30	268.0	20.9
0-40	442.4	34.5
0-60	805.7	62.8
0-90	1141.0	88.9
0-120	1244.0	96.9
0-180	1283	100.0
60-90	335.3	26.1
90-120	103.0	8.0
90-130	118.0	9.2
90-150	135.0	10.5
90-180	142.0	11.1

(5000K)

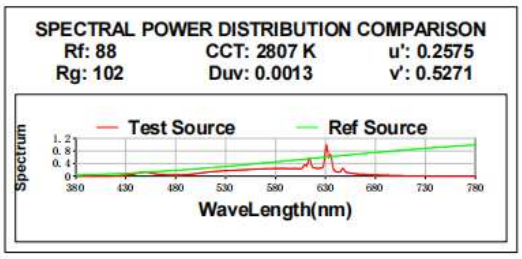
γ(°)	Lumens	% Total
0-30	248.2	20.9
0-40	409.7	34.5
0-60	746.4	62.8
0-90	1057.0	88.9
0-120	1152.0	96.9
0-180	1189.0	100.0
60-90	310.6	26.1
90-120	95.0	8.0
90-130	110.0	9.3
90-150	126.0	10.6
90-180	132.0	11.1

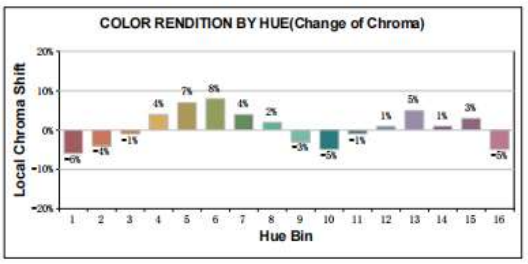
Table 4: Zonal Lumen Data

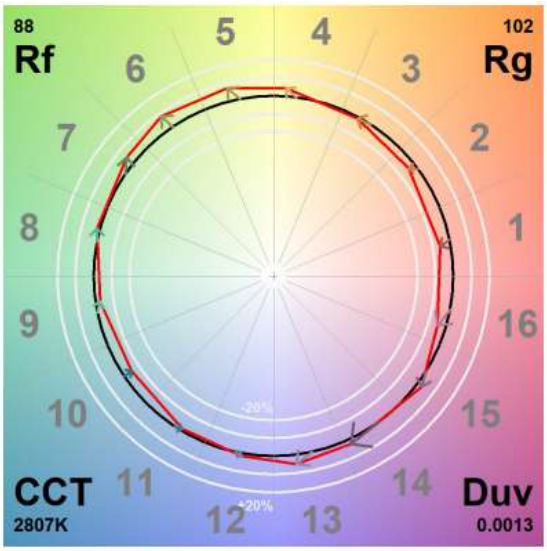
Color Rendition Report-Sphere Spectroradiometer Method(2700K)

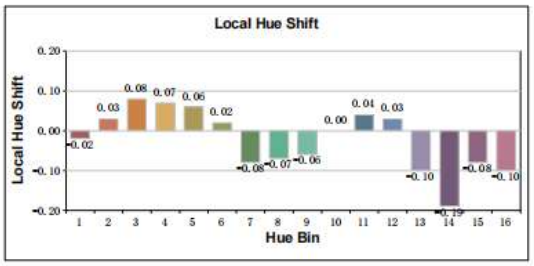
TM30

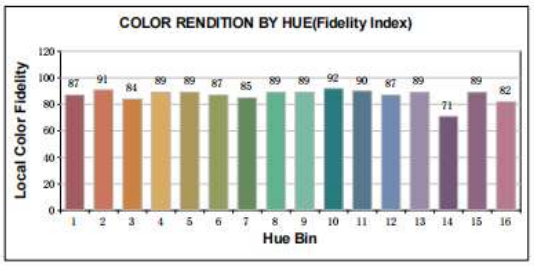
View Angle:2 Deg

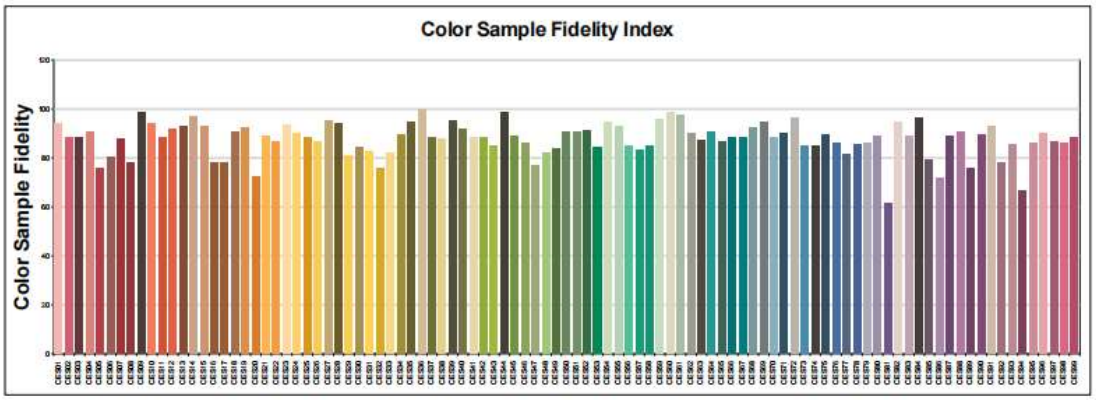












(3000K)

TM30

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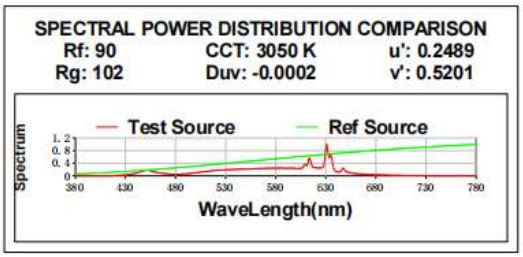

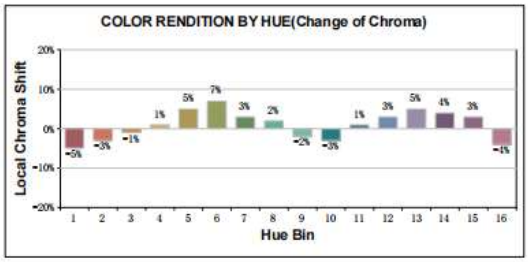

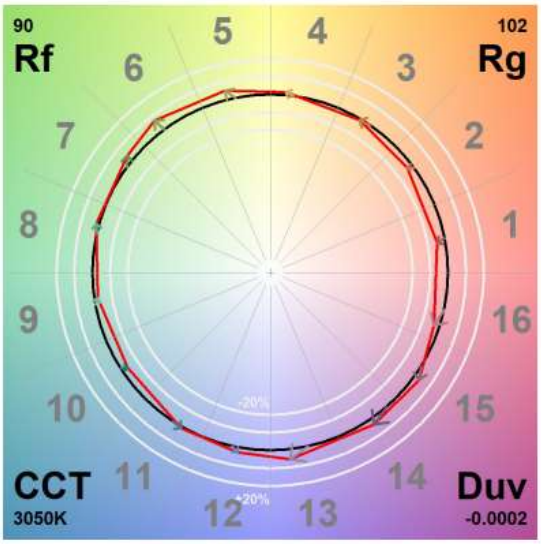

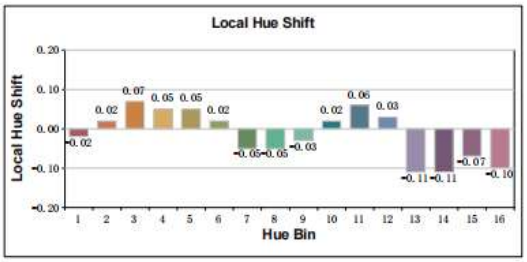

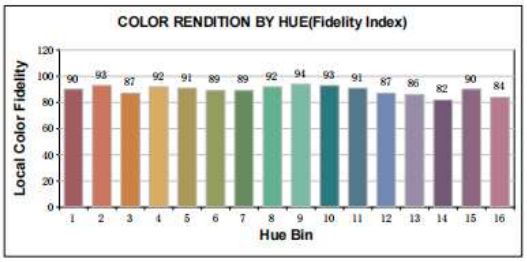

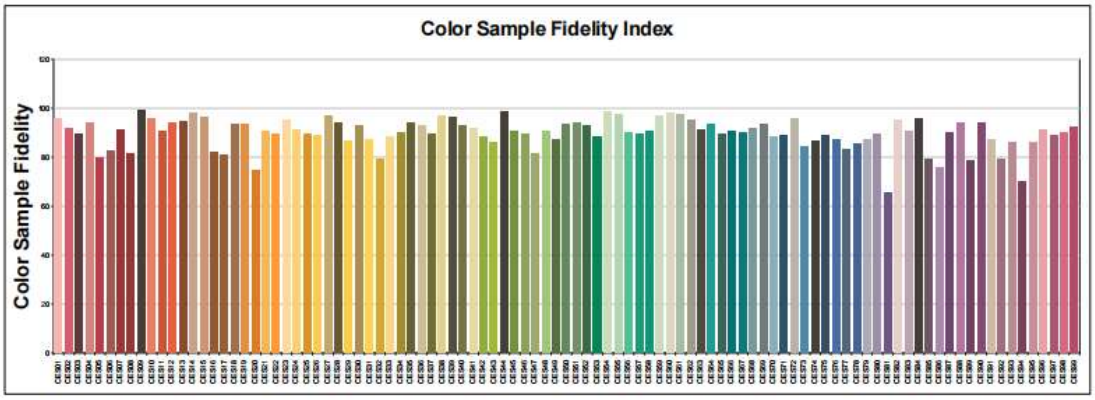

(3500K)

TM30

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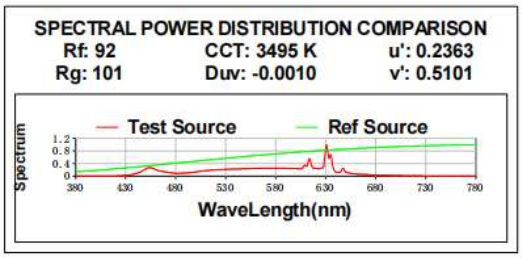
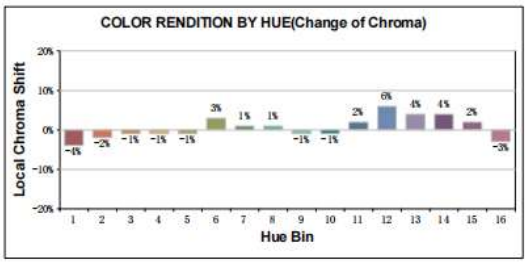
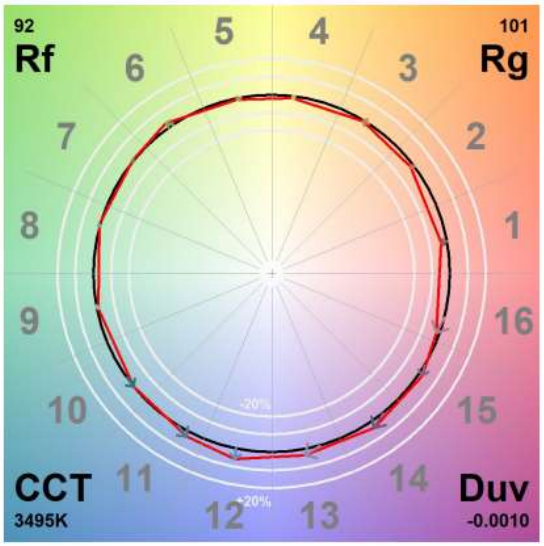
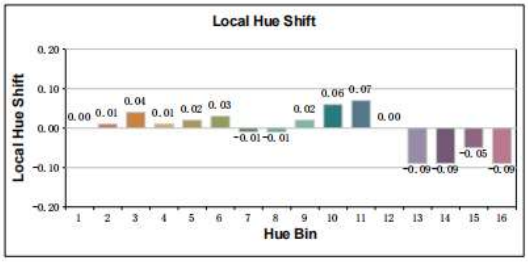
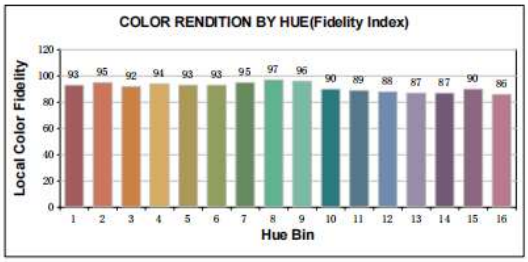
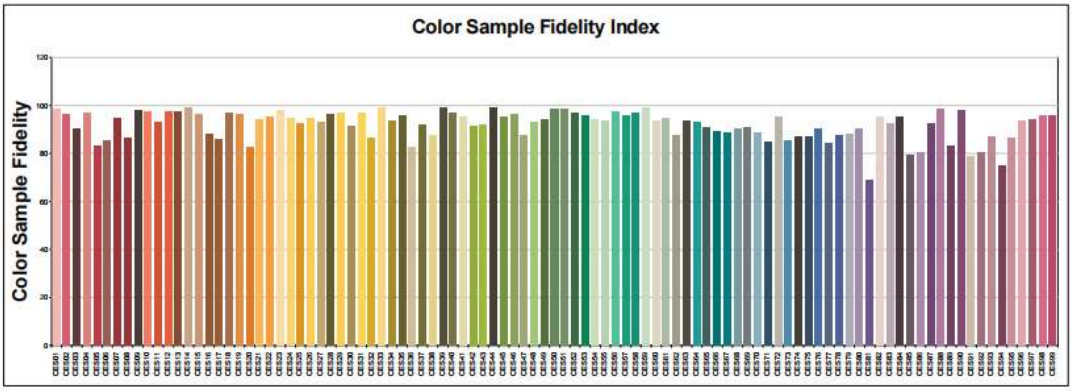








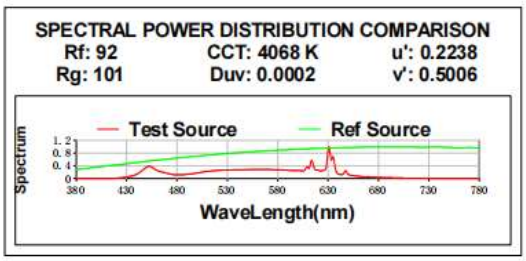


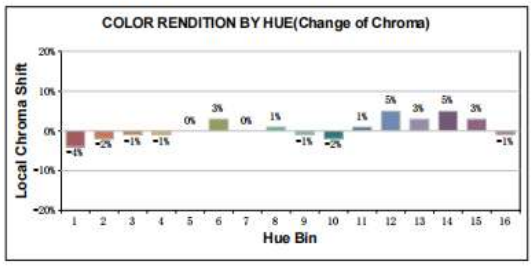


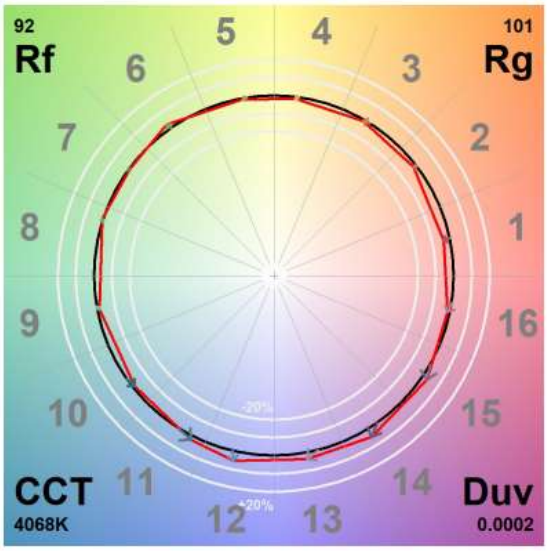
(4000K)

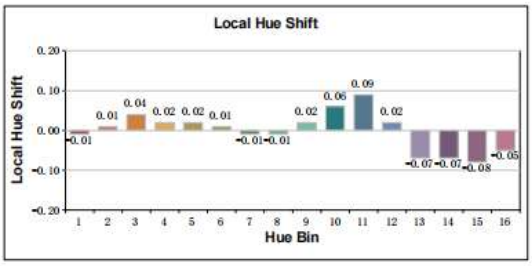
TM30

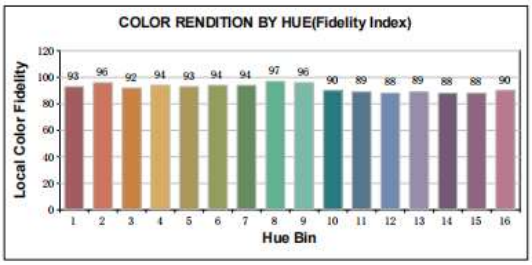
View Angle:2 Deg

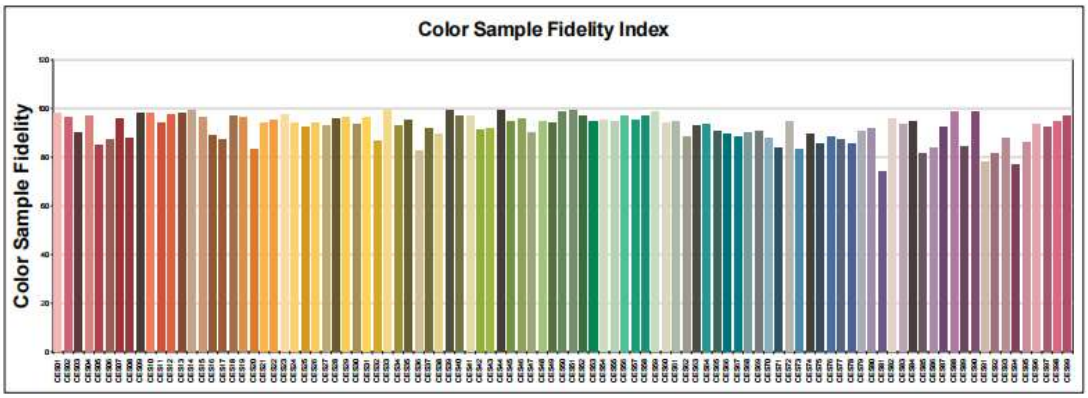












(5000K)

TM30

View Angle:2 Deg

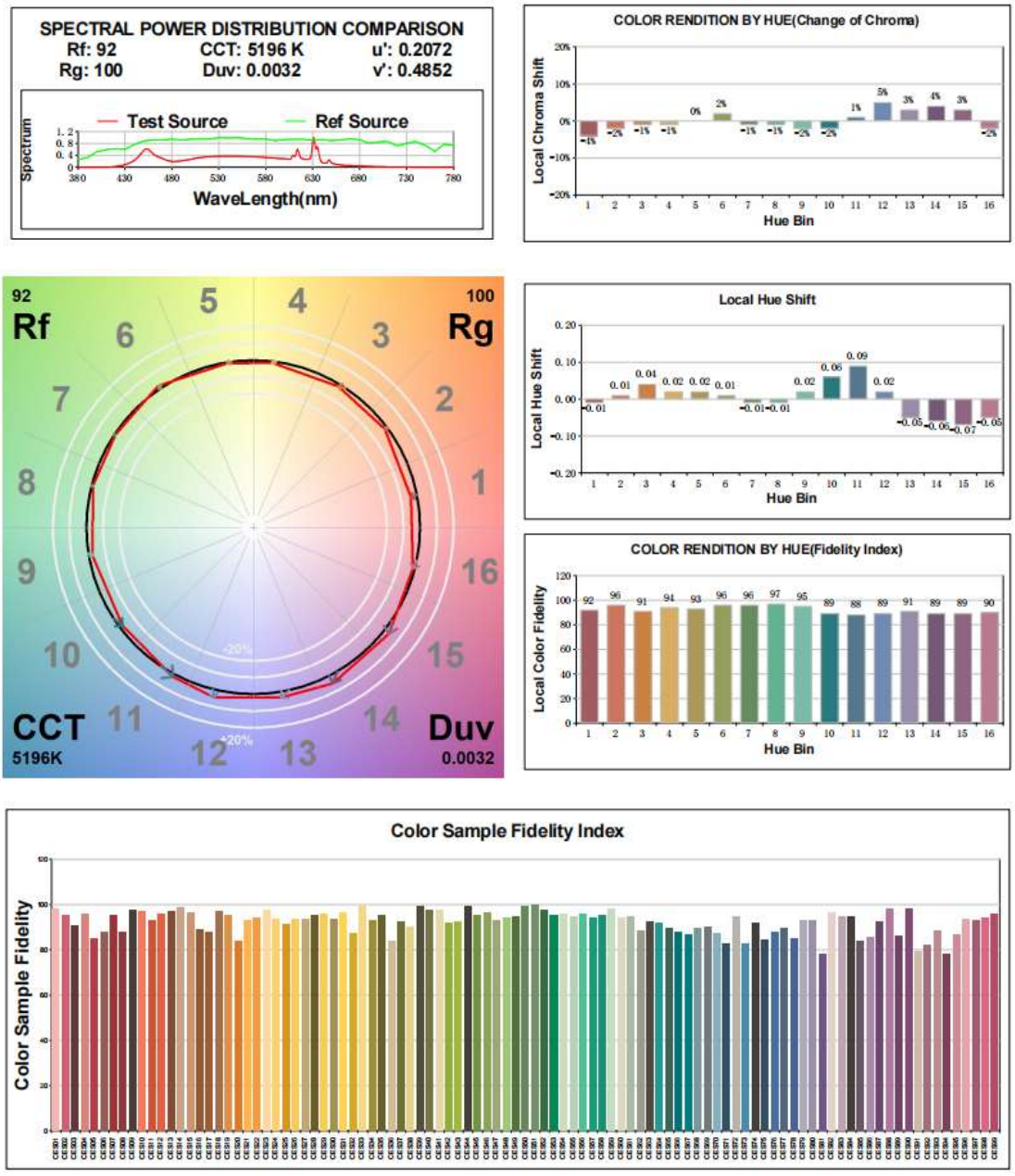
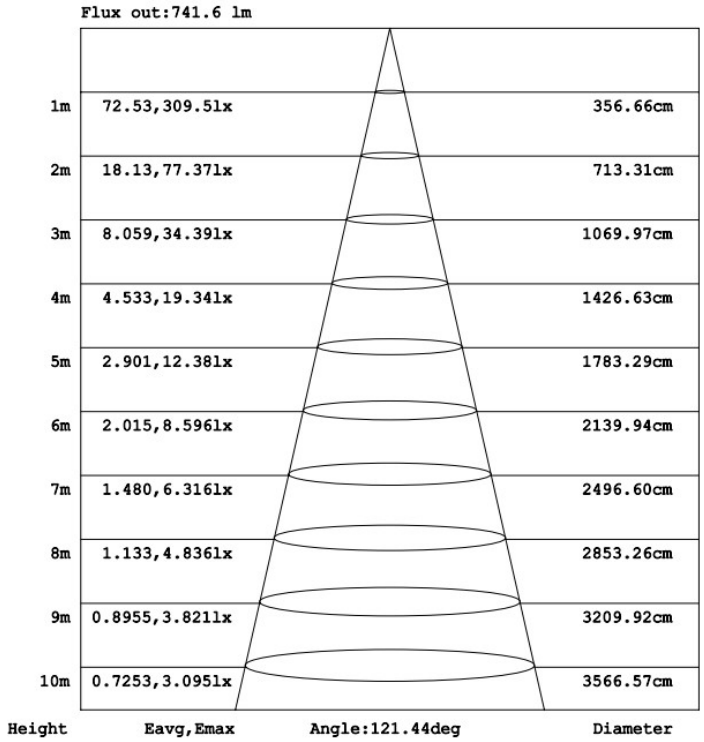
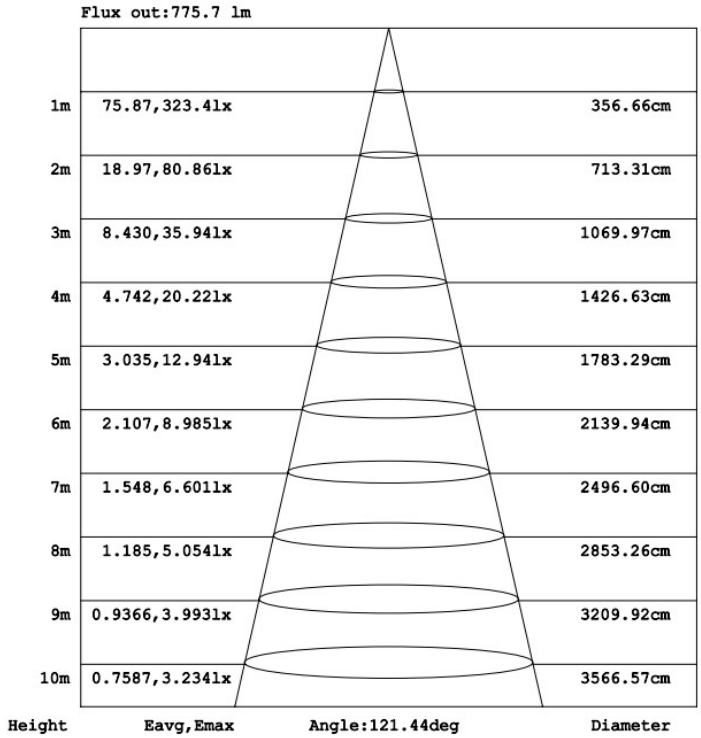


Chart 1: TM30

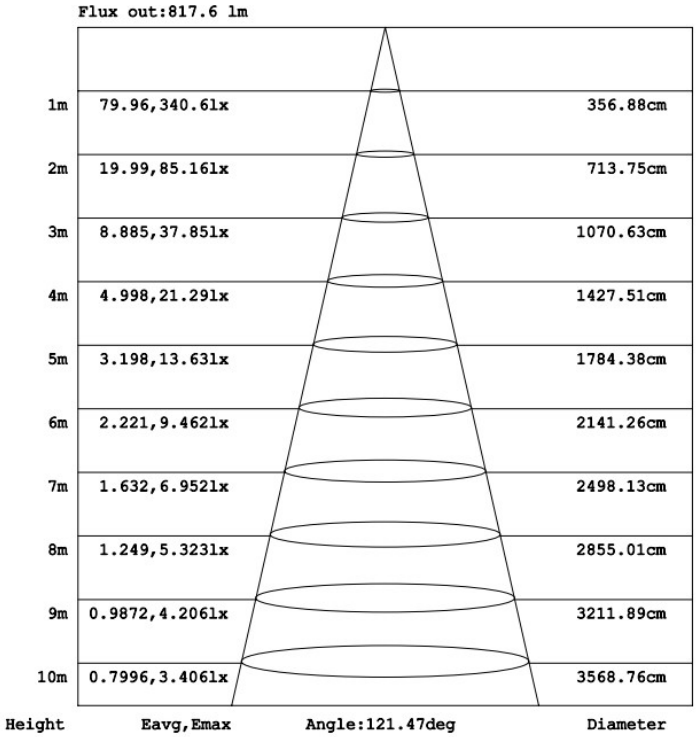
Illuminance Plots- Goniophotometer Method(2700K)



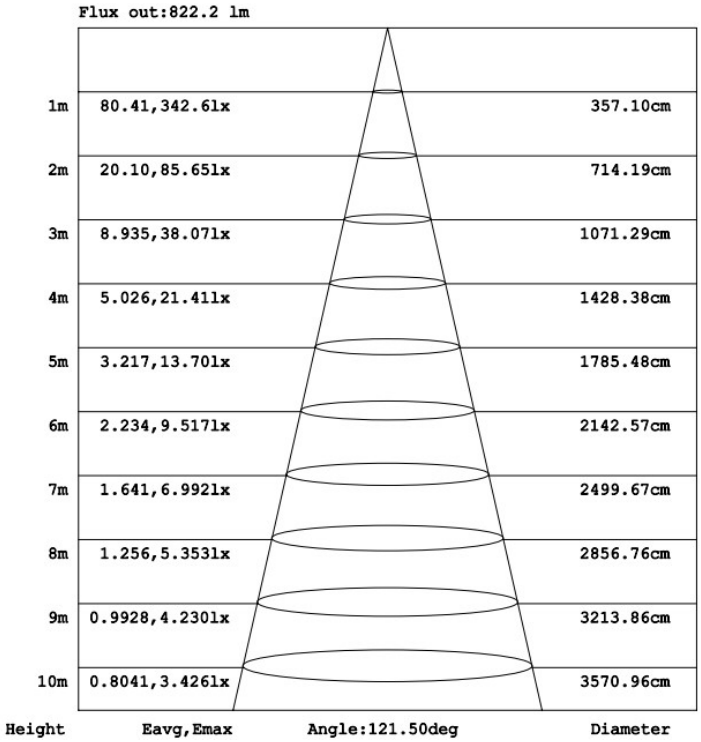
(3000K)



(3500K)


Flux out:817.6 lm
1m 79.96,340.61lx 356.88cm
2m 19.99,85.161lx 713.75cm
3m 8.885,37.851lx 1070.63cm
4m 4.998,21.291lx 1427.51cm
5m 3.198,13.631lx 1784.38cm
6m 2.221,9.462lx 2141.26cm
7m 1.632,6.952lx 2498.13cm
8m 1.249,5.323lx 2855.01cm
9m 0.9872,4.206lx 3211.89cm
10m 0.7996,3.406lx 3568.76cm
Height Eavg,Emax Angle:121.47deg Diameter

(4000K)


Flux out:822.2 lm
1m 80.41,342.61lx 357.10cm
2m 20.10,85.651lx 714.19cm
3m 8.935,38.071lx 1071.29cm
4m 5.026,21.411lx 1428.38cm
5m 3.217,13.701lx 1785.48cm
6m 2.234,9.517lx 2142.57cm
7m 1.641,6.992lx 2499.67cm
8m 1.256,5.353lx 2856.76cm
9m 0.9928,4.230lx 3213.86cm
10m 0.8041,3.426lx 3570.96cm
Height Eavg,Emax Angle:121.50deg Diameter

(5000K)

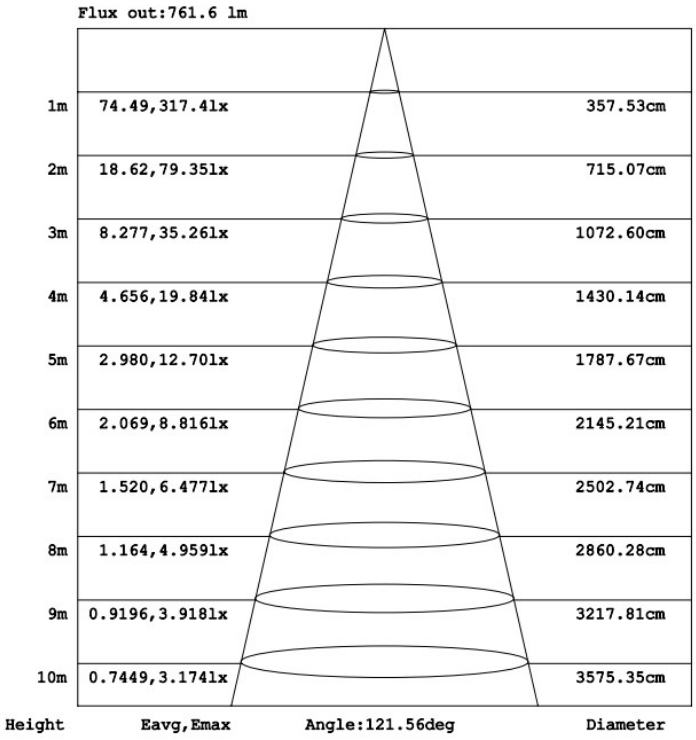
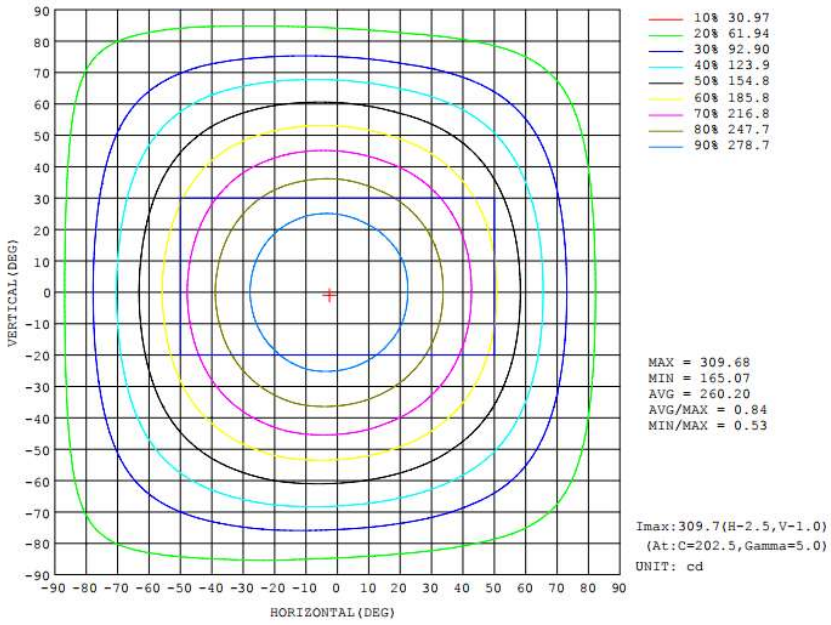
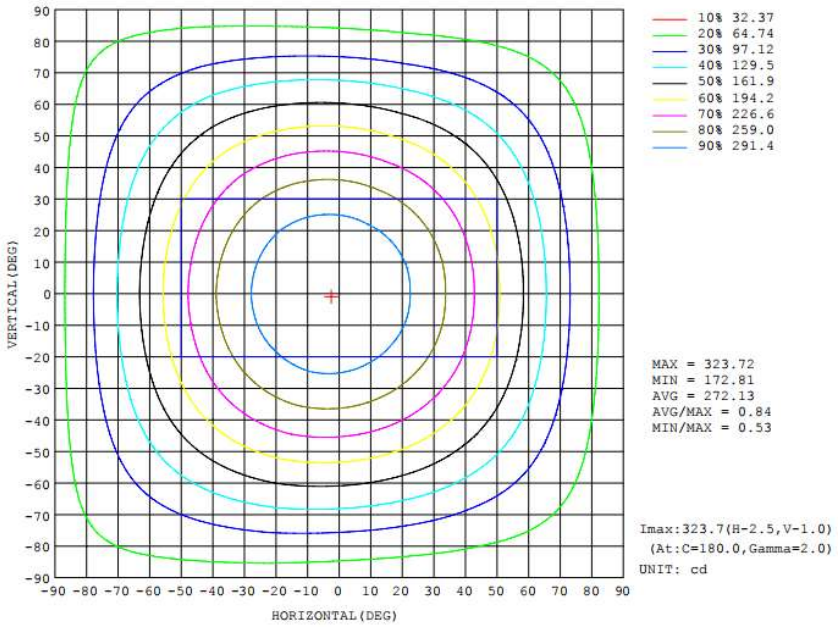


Chart 2: AAI Figure

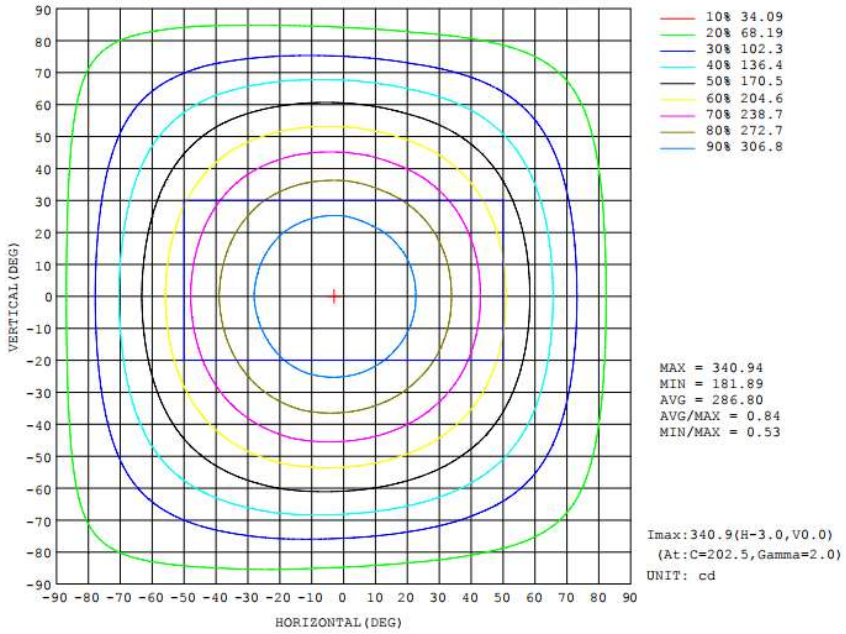
Luminous Intensity Distribution Plots- Goniophotometer Method(2700K)



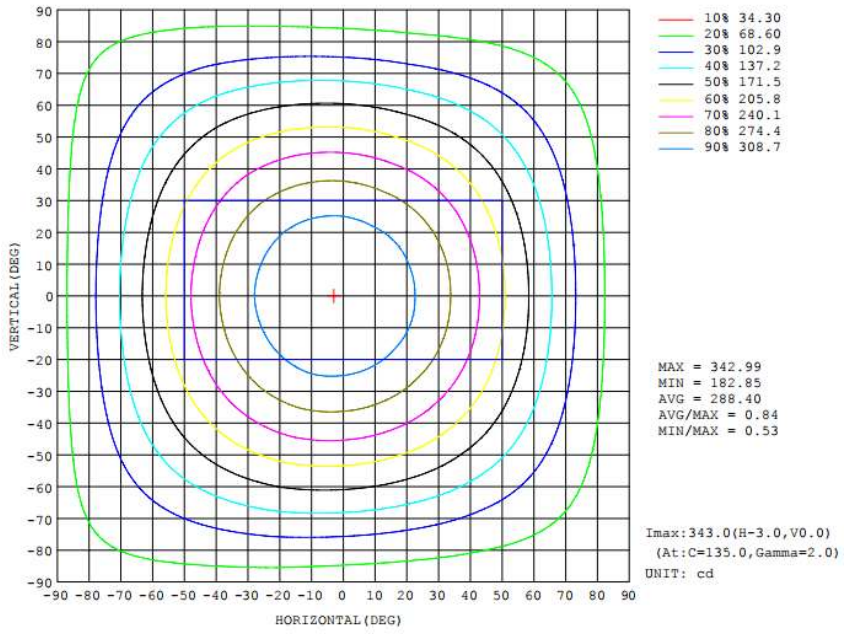
(3000K)



(3500K)


10% 34.09
20% 68.19
30% 102.3
40% 136.4
50% 170.5
60% 204.6
70% 238.7
80% 272.7
90% 306.8
MAX = 340.94
MIN = 181.89
AVG = 286.80
AVG/MAX = 0.84
MIN/MAX = 0.53
Imax:340.9(H-3.0,V0.0)
(At:C=202.5,Gamma=2.0)
UNIT: cd
VERTICAL(DEG)
HORIZONTAL(DEG)

(4000K)


10% 34.30
20% 68.60
30% 102.9
40% 137.2
50% 171.5
60% 205.8
70% 240.1
80% 274.4
90% 308.7
MAX = 342.99
MIN = 182.85
AVG = 288.40
AVG/MAX = 0.84
MIN/MAX = 0.53
Imax:343.0(H-3.0,V0.0)
(At:C=135.0,Gamma=2.0)
UNIT: cd
VERTICAL(DEG)
HORIZONTAL(DEG)

(5000K)

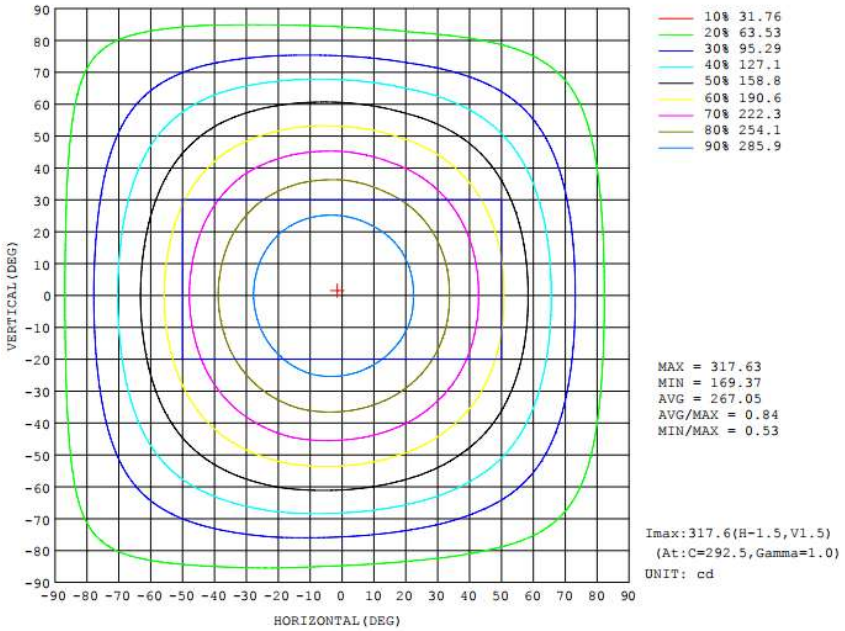
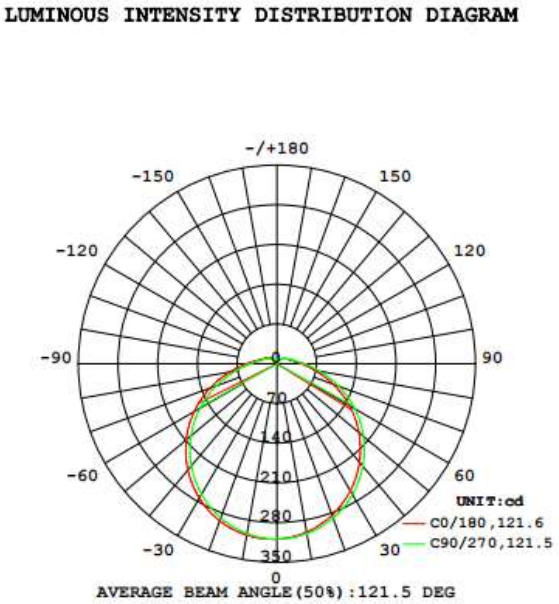


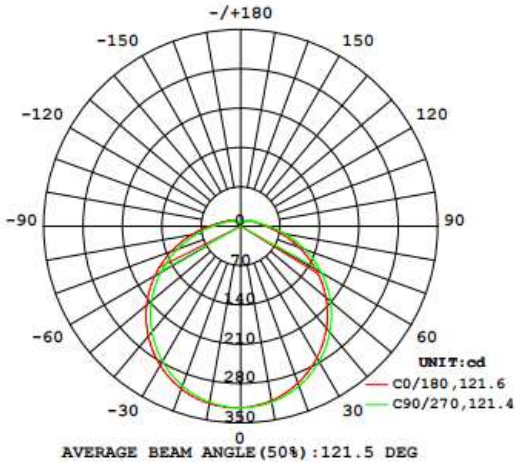
Chart 3: Isocandela Diagram

(2700K)



(3000K)

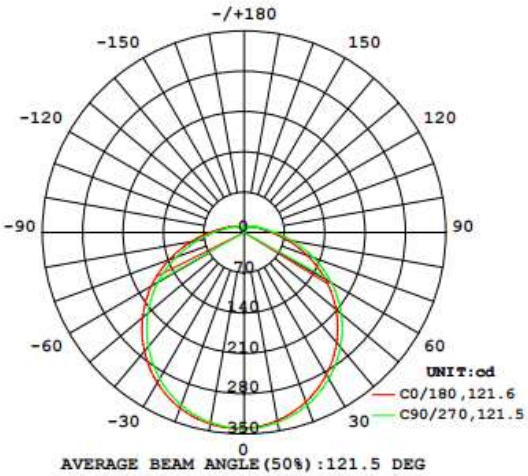
LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



AVERAGE BEAM ANGLE(50%):121.5 DEG

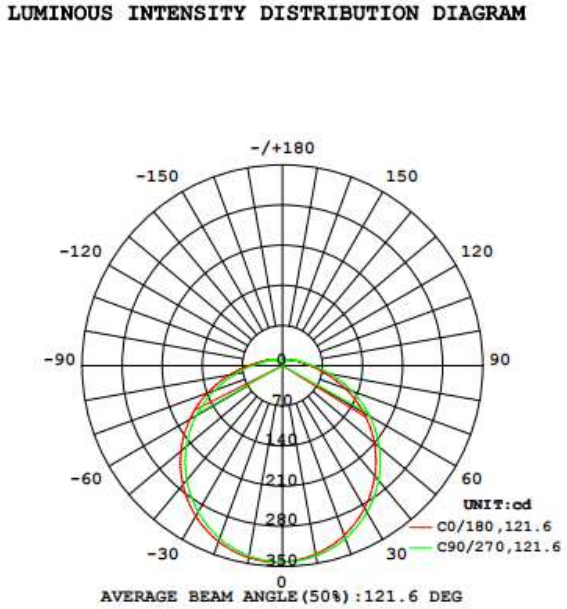
(3500K)

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



AVERAGE BEAM ANGLE(50%):121.5 DEG

(4000K)



(5000K)

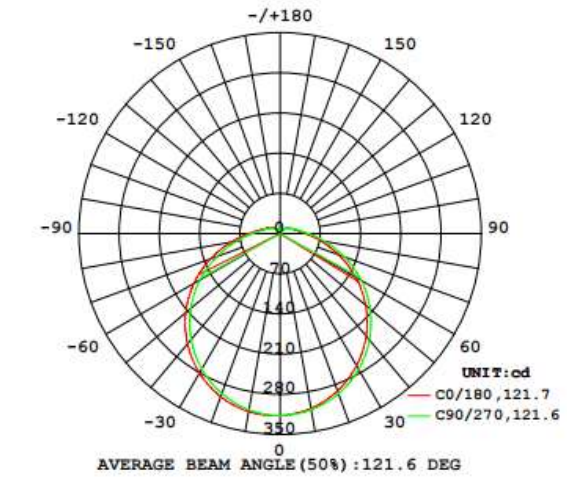


Chart 4: Luminous Intensity Distribution Diagram

Luminous Intensity Data- Goniophotometer Method(2700K)

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	309	309	309	309	309	309	309	309	309	309	309	309	309	309	309	309			
5	306	306	306	307	308	308	309	309	309	309	308	308	308	307	307	306			
10	301	301	301	303	304	305	306	306	307	307	306	305	304	303	302	302			
15	294	294	295	296	298	300	301	301	302	301	300	300	298	296	295	295			
20	284	285	285	287	289	292	293	294	295	295	293	292	289	287	286	285			
25	272	273	274	276	279	282	283	284	285	285	283	281	278	275	274	273			
30	259	260	260	263	266	270	271	272	273	273	271	269	266	263	261	260			
35	243	244	245	248	252	256	257	258	260	259	257	254	251	247	246	244			
40	227	228	228	232	236	240	241	243	244	243	242	238	235	230	229	228			
45	208	209	211	214	218	222	224	226	227	226	224	221	217	212	211	209			
50	189	190	191	195	199	204	206	207	209	208	206	202	198	193	191	190			
55	169	170	171	175	179	184	186	188	189	188	186	182	178	173	171	170			
60	148	149	150	154	159	163	165	167	168	167	165	161	157	151	150	149			
65	126	128	129	133	137	142	144	146	147	146	143	140	135	130	129	127			
70	105	107	108	111	116	121	122	124	126	124	122	118	114	109	107	106			
75	85.7	86.9	88.2	91.3	95.4	99.8	102	103	104	103	101	97.4	93.1	88.7	87.5	86.6			
80	68.6	69.6	70.7	73.4	76.8	80.7	82.3	83.7	84.6	83.5	81.7	78.4	74.8	71.1	70.0	69.2			
85	54.4	55.3	55.9	58.2	61.0	64.2	65.6	66.8	67.6	66.5	65.2	62.4	59.5	56.4	55.6	54.9			
90	43.3	43.9	44.4	46.0	48.2	50.8	51.8	52.8	53.5	52.6	51.5	49.4	47.1	44.8	44.2	43.7			
95	35.2	35.6	35.9	37.0	38.5	40.4	41.2	42.0	42.6	42.0	41.1	39.5	37.9	36.3	35.8	35.5			
100	29.6	29.9	30.0	30.8	31.8	33.1	33.7	34.3	34.7	34.3	33.7	32.6	31.5	30.4	30.1	29.9			
105	25.8	25.9	26.0	26.5	27.2	28.1	28.5	29.0	29.3	29.0	28.6	27.8	27.1	26.3	26.0	25.9			
110	22.6	22.7	22.8	23.2	23.8	24.5	24.8	25.1	25.4	25.2	24.8	24.3	23.7	23.1	22.8	22.7			
115	19.8	20.0	20.0	20.4	20.8	21.4	21.7	22.0	22.1	22.0	21.6	21.1	20.6	20.2	20.0	19.9			
120	17.4	17.5	17.6	17.9	18.3	18.7	18.9	19.1	19.3	19.1	18.8	18.4	18.0	17.6	17.4	17.4			
125	15.2	15.3	15.4	15.6	16.0	16.4	16.5	16.6	16.7	16.6	16.3	16.0	15.7	15.4	15.2	15.2			
130	13.3	13.4	13.5	13.7	14.0	14.3	14.4	14.4	14.5	14.3	14.1	13.8	13.6	13.4	13.3	13.2			
135	11.7	11.8	11.9	12.1	12.3	12.5	12.5	12.5	12.5	12.4	12.2	12.0	11.8	11.7	11.5	11.6			
140	10.3	10.4	10.5	10.6	10.8	10.9	10.9	10.9	10.8	10.7	10.5	10.4	10.3	10.2	10.1	10.1			
145	9.07	9.15	9.27	9.38	9.52	9.60	9.52	9.47	9.43	9.31	9.17	9.09	9.05	8.96	8.86	8.92			
150	8.09	8.16	8.25	8.34	8.49	8.52	8.43	8.30	8.23	8.16	8.04	8.03	8.01	7.96	7.86	7.94			
155	7.32	7.39	7.50	7.56	7.68	7.67	7.57	7.37	7.31	7.26	7.16	7.24	7.24	7.20	7.11	7.20			
160	6.80	6.87	6.98	7.00	7.09	7.08	6.99	6.77	6.65	6.66	6.61	6.71	6.71	6.71	6.65	6.71			
165	6.59	6.62	6.69	6.73	6.79	6.75	6.67	6.54	6.38	6.40	6.46	6.49	6.48	6.53	6.51	6.51			
170	6.67	6.74	6.72	6.75	6.74	6.74	6.64	6.62	6.61	6.60	6.64	6.63	6.64	6.68	6.68	6.63			
175	6.96	7.02	6.98	7.00	6.97	6.96	6.91	6.92	6.93	6.91	6.93	6.93	6.97	7.01	6.97	6.94			
180	7.19	7.21	7.21	7.21	7.22	7.22	7.20	7.19	7.19	7.21	7.21	7.22	7.22	7.26	7.23	7.19			

(3000K)

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	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323			
5	320	320	321	321	322	322	323	323	323	323	323	322	322	321	321	321			
10	315	315	316	317	318	319	319	320	321	320	320	319	318	317	316	315			
15	307	308	309	310	312	313	314	315	316	315	315	313	312	309	308	308			
20	297	298	299	300	303	305	306	307	308	307	307	305	303	300	299	298			
25	285	286	287	289	292	295	296	297	298	297	296	294	291	288	287	286			
30	271	271	273	275	279	282	283	285	286	285	284	281	278	274	273	272			
35	255	256	257	260	263	267	269	270	272	271	269	266	262	259	257	256			
40	237	238	239	243	247	251	252	254	255	254	253	249	245	241	239	238			
45	218	219	221	224	228	233	234	236	238	236	235	231	227	222	220	219			
50	198	199	200	204	208	213	215	217	218	217	215	211	207	202	200	199			
55	176	178	179	183	188	193	194	196	198	196	195	190	186	181	179	178			
60	154	156	157	161	166	171	173	175	176	174	173	169	163	159	157	156			
65	132	133	135	139	144	149	151	152	154	152	150	146	141	136	134	133			
70	110	111	113	117	121	126	128	130	131	129	128	123	119	114	112	111			
75	89.8	90.9	92.4	95.8	99.8	104	106	108	109	107	106	102	97.4	92.9	91.6	90.5			
80	71.9	72.8	74.0	77.0	80.4	84.5	86.1	87.5	88.3	87.0	85.5	82.0	78.3	74.5	73.3	72.5			
85	57.0	57.8	58.6	61.0	63.8	67.2	68.6	69.9	70.7	69.4	68.2	65.2	62.1	59.0	58.2	57.5			
90	45.4	45.9	46.5	48.2	50.4	53.1	54.1	55.3	55.9	54.9	53.9	51.5	49.3	46.9	46.3	45.7			
95	36.9	37.2	37.6	38.8	40.3	42.3	43.2	43.9	44.5	43.9	43.0	41.3	39.6	38.0	37.5	37.2			
100	31.1	31.2	31.5	32.2	33.2	34.6	35.2	35.9	36.3	35.8	35.3	34.1	32.9	31.8	31.5	31.2			
105	27.0	27.1	27.2	27.7	28.5	29.4	29.8	30.3	30.6	30.3	29.9	29.1	28.3	27.6	27.3	27.1			
110	23.7	23.8	23.9	24.3	24.9	25.6	25.9	26.3	26.6	26.3	26.0	25.4	24.7	24.1	23.9	23.8			
115	20.8	20.9	21.0	21.3	21.8	22.4	22.7	23.0	23.2	22.9	22.6	22.1	21.6	21.1	20.9	20.8			
120	18.2	18.3	18.4	18.7	19.1	19.6	19.8	20.0	20.1	19.9	19.7	19.2	18.8	18.4	18.2	18.2			
125	16.0	16.0	16.2	16.4	16.7	17.1	17.3	17.4	17.5	17.3	17.0	16.7	16.4	16.0	15.9	15.9			
130	14.0	14.1	14.2	14.4	14.7	15.0	15.0	15.1	15.2	15.0	14.7	14.5	14.2	14.0	13.9	13.8			
135	12.3	12.3	12.4	12.6	12.8	13.1	13.1	13.1	13.1	12.9	12.8	12.5	12.4	12.2	12.1	12.1			
140	10.7	10.8	10.9	11.1	11.3	11.4	11.4	11.4	11.4	11.2	11.0	10.9	10.8	10.6	10.6	10.6			
145	9.49	9.58	9.70	9.80	9.94	10.0	10.00	9.87	9.84	9.72	9.60	9.53	9.46	9.36	9.27	9.32			
150	8.47	8.53	8.64	8.74	8.86	8.89	8.84	8.70	8.61	8.49	8.40	8.40	8.37	8.30	8.22	8.30			
155	7.66	7.73	7.85	7.91	8.02	8.01	7.95	7.71	7.66	7.56	7.50	7.57	7.55	7.50	7.45	7.51			
160	7.12	7.18	7.29	7.34	7.42	7.39	7.34	7.10	6.97	6.95	6.92	7.02	7.00	6.97	6.95	7.00			
165	6.88	6.92	7.01	7.05	7.10	7.07	7.03	6.85	6.69	6.69	6.76	6.79	6.78	6.77	6.80	6.80			
170	6.98	7.04	7.04	7.07	7.03	7.03	7.02	6.95	6.91	6.90	6.97	6.94	6.96	6.93	6.98	6.92			
175	7.28	7.32	7.30	7.31	7.28	7.29	7.28	7.26	7.24	7.20	7.25	7.25	7.29	7.29	7.31	7.25			
180	7.52	7.53	7.55	7.54	7.54	7.55	7.58	7.54	7.52	7.52	7.54	7.54	7.54	7.54	7.53	7.51			

(3500K)

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	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340			
5	337	338	338	338	340	340	340	340	340	341	340	340	339	338	338	338			
10	332	332	333	334	335	336	337	337	338	338	337	336	335	333	333	332			
15	324	324	325	326	328	330	331	332	333	332	332	331	328	326	325	324			
20	313	314	315	317	319	322	323	324	325	324	323	321	319	316	315	314			
25	300	301	302	304	307	310	312	313	314	314	312	310	307	303	302	301			
30	285	286	287	290	293	297	298	300	301	301	299	296	293	289	287	286			
35	268	269	271	274	277	282	283	285	286	285	284	281	277	272	271	270			
40	250	251	252	256	260	264	266	268	269	268	267	263	259	254	252	251			
45	230	231	232	236	240	245	247	249	250	249	247	243	239	234	232	231			
50	208	210	211	215	220	225	227	228	230	229	227	223	218	213	211	210			
55	186	187	189	193	198	203	205	207	208	207	205	201	196	190	189	187			
60	163	164	166	170	175	180	182	184	186	184	182	178	173	167	165	164			
65	139	141	142	146	151	157	159	160	162	161	158	154	149	144	142	140			
70	116	117	119	123	128	133	135	137	138	137	135	130	125	120	119	117			
75	94.5	95.9	97.3	101	105	110	112	114	115	113	111	107	103	98.0	96.6	95.4			
80	75.8	76.8	78.0	81.0	84.8	88.9	90.8	92.2	93.3	91.9	90.1	86.5	82.7	78.6	77.3	76.4			
85	60.0	60.9	61.8	64.2	67.4	70.7	72.3	73.6	74.6	73.4	71.8	68.8	65.5	62.3	61.4	60.6			
90	47.8	48.5	49.0	50.8	53.3	56.0	57.1	58.3	59.0	58.0	56.8	54.3	51.9	49.5	48.8	48.2			
95	38.9	39.3	39.6	40.8	42.5	44.5	45.5	46.4	47.0	46.3	45.4	43.6	41.8	40.1	39.5	39.2			
100	32.7	33.0	33.1	34.0	35.1	36.5	37.1	37.8	38.3	37.9	37.2	35.9	34.8	33.6	33.2	32.9			
105	28.4	28.6	28.7	29.2	30.1	31.0	31.5	31.9	32.3	32.0	31.6	30.7	29.9	29.0	28.8	28.6			
110	25.0	25.1	25.2	25.6	26.3	27.0	27.4	27.8	28.0	27.8	27.4	26.7	26.1	25.4	25.2	25.0			
115	21.9	22.1	22.1	22.6	23.1	23.7	24.0	24.3	24.4	24.2	23.9	23.3	22.8	22.2	22.1	21.9			
120	19.2	19.3	19.4	19.7	20.2	20.7	20.9	21.1	21.3	21.0	20.7	20.3	19.8	19.4	19.3	19.2			
125	16.8	16.9	17.0	17.3	17.7	18.1	18.2	18.4	18.5	18.2	18.0	17.6	17.3	16.9	16.8	16.8			
130	14.7	14.8	14.9	15.2	15.5	15.8	15.9	15.9	16.0	15.8	15.6	15.3	15.0	14.7	14.6	14.6			
135	12.9	13.0	13.1	13.3	13.6	13.8	13.8	13.8	13.8	13.7	13.5	13.2	13.0	12.8	12.8	12.8			
140	11.3	11.4	11.5	11.7	11.9	12.0	12.0	12.0	12.0	11.8	11.6	11.5	11.4	11.2	11.1	11.2			
145	9.98	10.1	10.2	10.3	10.5	10.6	10.5	10.4	10.4	10.2	10.1	10.0	9.93	9.82	9.76	9.82			
150	8.91	9.00	9.12	9.21	9.36	9.39	9.29	9.17	9.08	8.97	8.85	8.84	8.82	8.74	8.68	8.76			
155	8.07	8.14	8.26	8.35	8.46	8.45	8.32	8.15	8.06	7.97	7.90	7.97	7.98	7.89	7.85	7.94			
160	7.48	7.54	7.67	7.73	7.82	7.78	7.69	7.48	7.32	7.32	7.28	7.38	7.39	7.35	7.33	7.40			
165	7.23	7.29	7.37	7.41	7.48	7.42	7.37	7.22	7.03	7.05	7.14	7.15	7.15	7.12	7.17	7.17			
170	7.35	7.41	7.39	7.45	7.43	7.40	7.33	7.32	7.27	7.27	7.32	7.30	7.33	7.31	7.33	7.31			
175	7.65	7.71	7.69	7.69	7.65	7.66	7.61	7.64	7.63	7.60	7.63	7.63	7.68	7.66	7.68	7.66			
180	7.91	7.93	7.94	7.94	7.95	7.93	7.93	7.92	7.91	7.93	7.93	7.94	7.95	7.95	7.93	7.93			

(4000K)

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	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342			
5	339	339	339	340	341	342	343	342	342	342	342	341	341	340	340	340			
10	334	334	334	335	337	338	339	339	340	339	339	338	337	336	335	334			
15	326	326	326	328	330	332	333	334	334	334	333	332	330	328	328	326			
20	315	315	316	318	321	324	325	326	326	326	325	323	321	318	317	316			
25	302	303	303	306	309	312	313	315	316	315	314	311	309	305	305	303			
30	287	288	289	291	295	299	301	302	303	302	301	298	295	291	290	288			
35	270	271	272	275	279	283	285	287	288	287	285	282	278	274	273	271			
40	251	252	253	257	261	266	268	269	271	270	268	264	260	255	254	253			
45	231	232	233	237	242	246	249	250	252	251	249	245	240	236	234	232			
50	210	211	212	216	221	226	228	230	231	230	228	224	219	214	213	211			
55	187	188	190	194	199	204	207	208	210	208	206	202	197	191	190	188			
60	164	165	167	171	176	181	184	185	187	185	183	179	174	168	167	165			
65	140	141	143	147	152	158	160	162	163	161	159	155	150	144	143	141			
70	117	118	120	124	129	134	136	138	139	137	135	131	126	121	119	118			
75	95.1	96.4	97.9	101	106	111	113	114	116	114	112	108	103	98.6	97.4	96.1			
80	76.2	77.2	78.4	81.5	85.3	89.6	91.4	92.8	93.9	92.4	90.6	87.0	83.0	79.0	78.0	76.9			
85	60.5	61.2	62.1	64.5	67.7	71.5	72.8	74.1	75.0	73.8	72.3	69.2	66.0	62.6	61.9	61.0			
90	48.2	48.8	49.3	51.2	53.5	56.4	57.6	58.7	59.4	58.4	57.1	54.7	52.3	49.7	49.2	48.5			
95	39.2	39.5	39.9	41.1	42.8	44.9	45.9	46.7	47.3	46.6	45.7	43.9	42.1	40.4	39.9	39.5			
100	32.9	33.1	33.3	34.1	35.3	36.8	37.5	38.1	38.6	38.1	37.4	36.2	35.0	33.8	33.5	33.2			
105	28.6	28.7	28.8	29.4	30.2	31.2	31.8	32.2	32.5	32.2	31.8	30.9	30.1	29.3	29.1	28.8			
110	25.1	25.2	25.3	25.8	26.4	27.2	27.6	28.0	28.2	28.0	27.6	26.9	26.3	25.6	25.4	25.2			
115	22.0	22.2	22.3	22.6	23.2	23.8	24.1	24.4	24.6	24.4	24.0	23.5	22.9	22.4	22.2	22.1			
120	19.3	19.4	19.5	19.8	20.3	20.8	21.1	21.3	21.4	21.2	20.9	20.4	20.0	19.5	19.4	19.3			
125	16.9	17.0	17.1	17.4	17.8	18.2	18.4	18.5	18.6	18.3	18.1	17.7	17.3	17.0	16.9	16.9			
130	14.8	14.9	15.0	15.2	15.6	15.9	16.0	16.1	16.1	15.9	15.7	15.4	15.1	14.8	14.8	14.7			
135	13.0	13.1	13.2	13.4	13.6	13.8	13.9	14.0	13.9	13.7	13.5	13.3	13.1	12.9	12.8	12.8			
140	11.4	11.5	11.6	11.8	11.9	12.1	12.1	12.1	12.0	11.9	11.7	11.5	11.4	11.3	11.2	11.2			
145	10.0	10.1	10.2	10.4	10.5	10.6	10.6	10.5	10.4	10.3	10.1	10.1	9.98	9.88	9.81	9.87			
150	8.95	9.03	9.14	9.26	9.39	9.43	9.34	9.23	9.12	9.01	8.88	8.90	8.86	8.78	8.73	8.81			
155	8.09	8.16	8.29	8.37	8.48	8.48	8.40	8.19	8.10	8.00	7.92	8.00	7.99	7.94	7.89	7.97			
160	7.52	7.57	7.70	7.76	7.86	7.81	7.74	7.51	7.36	7.34	7.31	7.41	7.42	7.39	7.36	7.43			
165	7.26	7.30	7.39	7.43	7.50	7.45	7.39	7.25	7.05	7.06	7.14	7.17	7.17	7.16	7.20	7.20			
170	7.39	7.43	7.41	7.45	7.45	7.44	7.38	7.34	7.29	7.28	7.34	7.32	7.35	7.34	7.38	7.34			
175	7.70	7.73	7.70	7.74	7.69	7.68	7.66	7.67	7.65	7.63	7.66	7.66	7.70	7.71	7.71	7.68			
180	7.95	7.97	7.96	7.97	7.98	7.98	7.97	7.96	7.95	7.95	7.95	7.96	7.98	7.97	7.97	7.97			

(5000K)

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	317	317	317	317	317	317	317	317	317	317	317	317	317	317	317	317
5	314	315	315	315	316	316	316	317	317	317	317	317	316	315	315	314
10	309	309	310	311	312	313	313	314	315	314	314	313	311	311	310	309
15	302	302	302	303	305	308	308	309	310	309	309	307	305	304	303	302
20	291	292	293	294	297	300	300	301	302	302	301	299	296	295	293	292
25	280	280	281	283	286	289	290	291	292	292	291	289	285	283	281	280
30	266	267	268	270	273	277	278	279	281	280	279	276	272	270	268	267
35	250	251	252	255	258	263	264	265	267	266	264	261	258	254	252	251
40	233	234	235	238	242	246	248	249	251	250	248	245	240	237	235	234
45	214	215	217	220	223	229	230	232	233	232	231	227	223	218	216	215
50	194	195	197	200	204	210	211	213	215	213	212	207	203	199	197	195
55	173	175	176	180	184	189	191	193	194	193	191	187	182	178	176	174
60	152	153	155	158	163	168	170	172	173	172	170	166	161	156	154	153
65	130	131	133	137	141	146	148	150	151	150	148	143	139	134	132	131
70	108	110	111	115	119	124	126	128	129	127	125	121	117	112	111	109
75	88.2	89.5	90.9	94.0	98.0	103	104	106	107	106	104	100	95.6	91.4	90.0	88.9
80	70.8	71.6	72.8	75.5	79.0	83.2	84.5	86.1	86.9	85.7	84.0	80.7	76.8	73.4	72.1	71.3
85	56.0	56.8	57.7	59.8	62.7	66.1	67.4	68.8	69.5	68.5	67.1	64.2	61.1	58.2	57.2	56.5
90	44.7	45.2	45.7	47.4	49.5	52.3	53.3	54.4	55.0	54.2	53.1	50.8	48.5	46.2	45.5	45.0
95	36.3	36.6	37.0	38.2	39.7	41.6	42.4	43.3	43.8	43.2	42.3	40.7	39.0	37.5	36.9	36.6
100	30.6	30.7	30.9	31.7	32.7	34.1	34.7	35.4	35.8	35.4	34.7	33.5	32.4	31.4	31.1	30.8
105	26.6	26.7	26.8	27.3	28.0	29.0	29.4	29.9	30.2	29.9	29.4	28.6	27.9	27.2	26.9	26.7
110	23.3	23.4	23.6	23.9	24.5	25.3	25.6	25.9	26.2	26.0	25.6	25.0	24.3	23.8	23.5	23.4
115	20.5	20.5	20.6	21.0	21.4	22.1	22.4	22.7	22.8	22.6	22.3	21.7	21.2	20.8	20.6	20.5
120	17.9	18.0	18.1	18.4	18.8	19.3	19.5	19.7	19.9	19.7	19.4	18.9	18.5	18.1	17.9	17.9
125	15.7	15.8	15.9	16.1	16.5	16.9	17.0	17.1	17.2	17.1	16.8	16.4	16.1	15.8	15.7	15.6
130	13.7	13.8	13.9	14.1	14.4	14.7	14.8	14.9	14.9	14.7	14.5	14.2	14.0	13.8	13.7	13.6
135	12.0	12.1	12.2	12.4	12.6	12.8	12.9	12.9	12.9	12.7	12.5	12.3	12.1	12.0	11.9	11.9
140	10.5	10.6	10.7	10.9	11.0	11.2	11.2	11.2	11.2	11.0	10.8	10.7	10.6	10.4	10.3	10.4
145	9.31	9.36	9.49	9.62	9.76	9.83	9.77	9.72	9.68	9.54	9.40	9.33	9.26	9.18	9.10	9.16
150	8.29	8.33	8.44	8.56	8.66	8.73	8.62	8.52	8.47	8.34	8.22	8.21	8.19	8.13	8.05	8.12
155	7.48	7.54	7.65	7.74	7.82	7.85	7.74	7.57	7.50	7.40	7.34	7.39	7.38	7.33	7.29	7.37
160	6.94	6.98	7.11	7.16	7.25	7.22	7.12	6.94	6.83	6.79	6.74	6.86	6.83	6.80	6.79	6.85
165	6.70	6.72	6.83	6.87	6.92	6.89	6.83	6.69	6.53	6.54	6.59	6.61	6.61	6.62	6.63	6.64
170	6.82	6.85	6.85	6.89	6.86	6.87	6.79	6.78	6.77	6.72	6.79	6.75	6.77	6.77	6.78	6.76
175	7.10	7.12	7.12	7.14	7.08	7.09	7.06	7.07	7.11	7.03	7.07	7.06	7.10	7.11	7.12	7.08
180	7.34	7.33	7.35	7.35	7.35	7.36	7.35	7.34	7.37	7.34	7.35	7.34	7.35	7.36	7.34	7.34

Table 5: Luminous Intensity Data

---End of Report---