

# Photometric Test Report

## Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77:2014

## Prepared For

**RAB Lighting Inc.**

Room 6A33, No.1388, Wuzhong road, Shanghai, China

Xiao Xiang, 15921313292, Gary.Xiao@rabweb.com

## Prepared By

**Deliver Co., Ltd.**

Block 11, 78 Keling Road, SSTP, Suzhou, China

0512-66801950, kevin.jia@szdeliver.com

## Project Number

**DLF2310103**

## Report Number

**DLF2310103-21a**

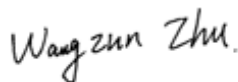
## Test Date

**2023/10/23**

## Issue Date

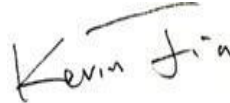
**2023/10/24**

## Prepared By



Wangzun Zhu

## Approved By



Kevin Jia

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

This report shall not be reproduced, except in full, without written approval of Deliver Co., Ltd.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP.

## 1.0 Test Summary

DLC Technical Requirements v5.1

Outdoor - Stairwell and Passageway Luminaires Indoor - Direct Linear Ambient Luminaires/Low Bay				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	5000		2787
Lumen/ft (Goniophotometer - Section 4.2)	IES LM-79-2008	≥375		697
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 115	Premium 130	154.8
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		18.0
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	5.58%
		20.00%	277V	8.87%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.995
		0.9	277V	0.930
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	5029±355	5114
		4 step	5029±220	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥80		85
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥0		14
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		84
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		96
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-12%≤IES Rcs,h1≤+23%		-12%
Zonal Lumen Requirement (0°-90°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≥85%		97.36%
Zonal Lumen Requirement (0°-60°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≥40%		82.38%
Zonal Lumen Requirement (20°-50°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≥30%		54.06%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22 <25		22.5
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		277
(Goniophotometer - Section 4.2)		Non-Wroست Case		120
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		0.070
(Goniophotometer - Section 4.2)		Non-Wroست Case		0.148
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		18.0
(Goniophotometer - Section 4.2)		Non-Wroست Case		17.7

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023/10/23	CS4 @50% Power /5000K	U1
2	Goniophotometer Test	2023/10/23	CS4 @50% Power /5000K	U1
3	THD and PF Test	2023/10/23	CS4 @50% Power /5000K	U1

### Remark(If any)

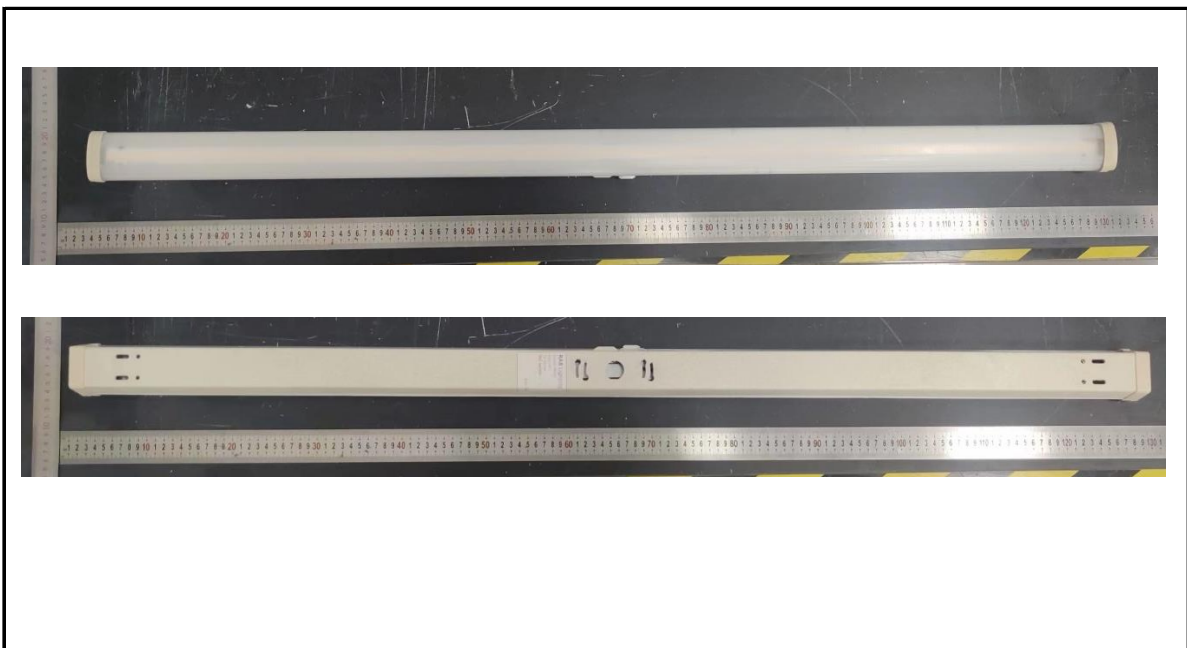
- 1、 This report shall not be used by the client to claim product endorsement by NVLAP, NIST or any agency of the US government.
- 2、 The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.

## 3.0 Production Description

**Luminaire Description:** CS4 @50% Power /5000K

**Electrical Specification:** 120V-277V,50/60HZ

### Photos of Luminaire Characteristics



## 4.0 LM-79 Measurement and Test Results

### 4.1 Integrating Sphere Test

Model No.	CS4 @50% Power /5000K	Sample ID.	U1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.1	Humidity (%RH)	57.0

#### Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ .

The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within  $\pm 0.2$  percent under load.

The sample was measured using  $4\pi$  geometry and 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.

#### Test Result

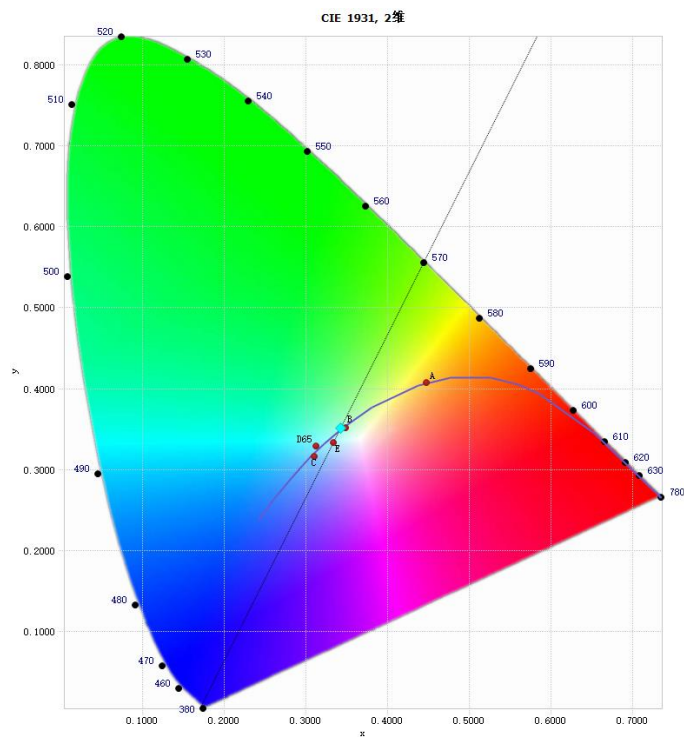
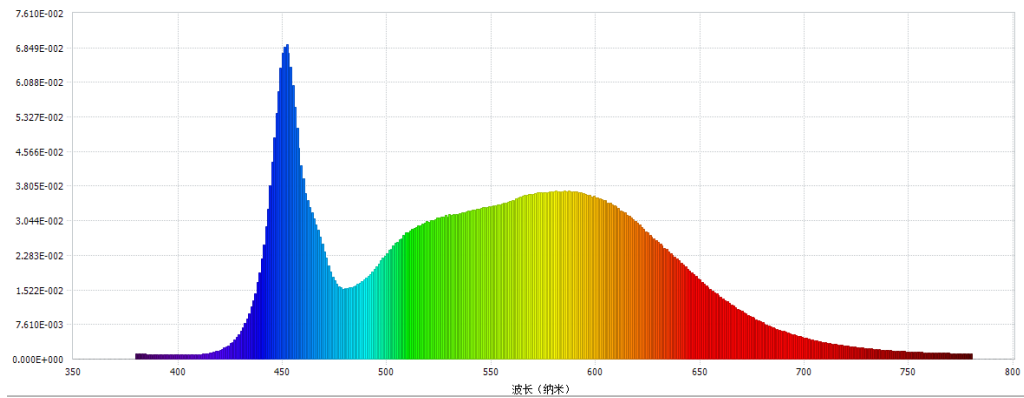
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.07	60	0.148	17.7	0.995
276.99	60	0.070	18.0	0.930

#### Test Result

CCT (K)	CRI	R9	Duv
5114	85	14	0.0009

Rf	Rg	IES Rcs,h1
84	96	-12%

#### 4.1 Integrating Sphere Test



## 4.1 Integrating Sphere Test

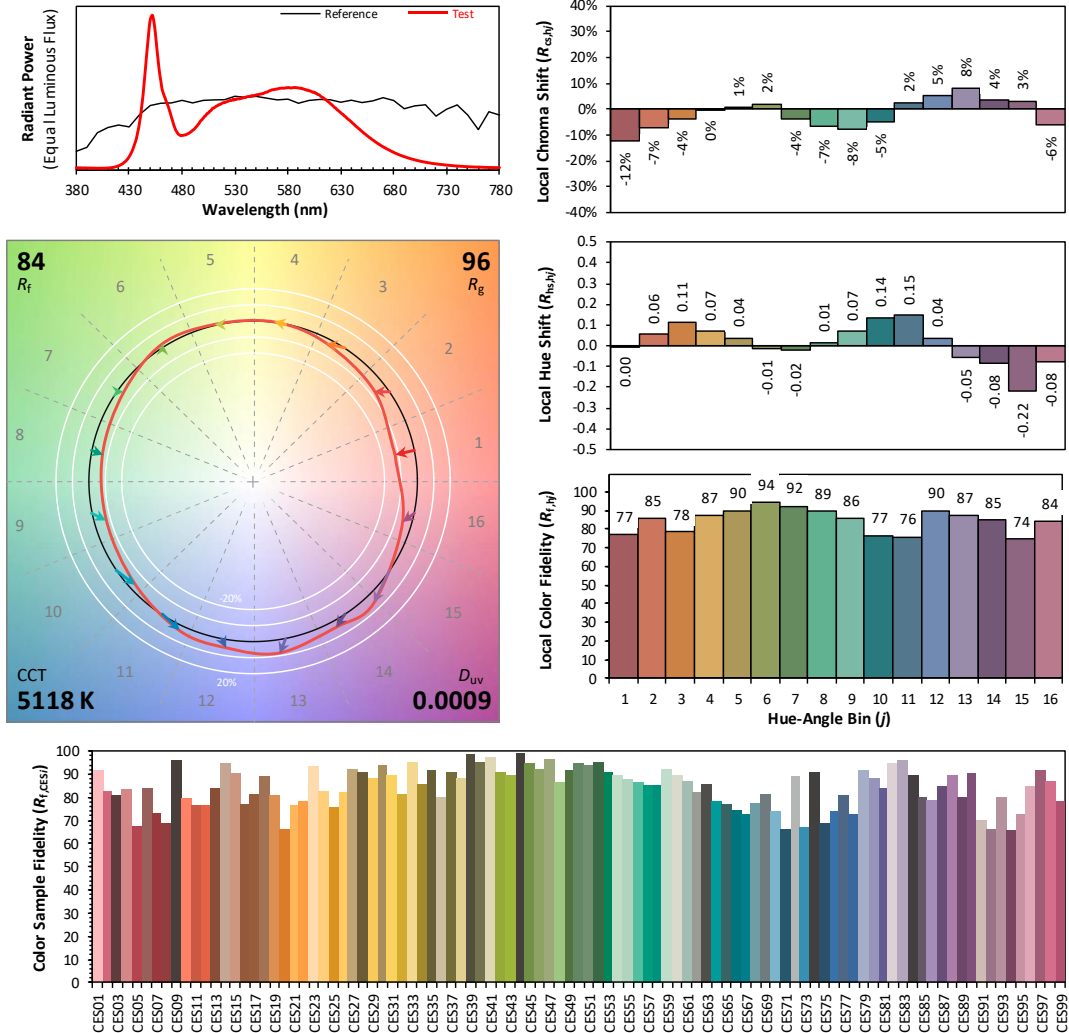
### IES TM-30-18 Color Rendition Report

Source: DLF2310103-21a

Manufacturer: RAB Lighting Inc.

Date: 2023/10/23

Model: CS4 @50% Power /5000K



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

$x$  0.3420  
 $y$  0.3508  
 $u'$  0.2096  
 $v'$  0.4838

CIE 13.3-1995  
(CRI)

$R_a$  85  
 $R_g$  19

#### 4.1 Integrating Sphere Test

Spectral Distribution over Visible Wavelength							
WL (nm)	Radiant (Watts/nm)	WL (nm)	Radiant (Watts/nm)	WL (nm)	Radiant (Watts/nm)	WL (nm)	Radiant (Watts/nm)
380	1.13E-03	485	1.62E-02	590	3.67E-02	695	5.28E-03
385	1.05E-03	490	1.78E-02	595	3.63E-02	700	4.63E-03
390	1.00E-03	495	2.03E-02	600	3.55E-02	705	4.06E-03
395	9.48E-04	500	2.33E-02	605	3.49E-02	710	3.59E-03
400	9.07E-04	505	2.56E-02	610	3.35E-02	715	3.18E-03
405	9.06E-04	510	2.78E-02	615	3.17E-02	720	2.84E-03
410	1.01E-03	515	2.93E-02	620	2.98E-02	725	2.55E-03
415	1.28E-03	520	3.01E-02	625	2.78E-02	730	2.29E-03
420	1.97E-03	525	3.11E-02	630	2.57E-02	735	2.07E-03
425	3.42E-03	530	3.17E-02	635	2.37E-02	740	1.88E-03
430	6.05E-03	535	3.20E-02	640	2.16E-02	745	1.75E-03
435	1.15E-02	540	3.25E-02	645	1.94E-02	750	1.57E-03
440	2.20E-02	545	3.32E-02	650	1.74E-02	755	1.46E-03
445	4.33E-02	550	3.36E-02	655	1.54E-02	760	1.42E-03
450	6.73E-02	555	3.41E-02	660	1.36E-02	765	1.31E-03
455	6.02E-02	560	3.49E-02	665	1.19E-02	770	1.23E-03
460	3.97E-02	565	3.59E-02	670	1.05E-02	775	1.20E-03
465	3.08E-02	570	3.63E-02	675	9.16E-03	780	1.16E-03
470	2.36E-02	575	3.67E-02	680	8.00E-03		
475	1.72E-02	580	3.69E-02	685	6.95E-03		
480	1.56E-02	585	3.69E-02	690	6.08E-03		



## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

Model No.	CS4 @50% Power /5000K	Sample ID.	U1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	54.0

#### Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using a type C goniophotometer and software.

The ambient temperature shall be maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , measured at a point not more than 1 m from the sample and at the same height as the sample.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within  $\pm 0.2$  percent under load.

The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at  $0.5^{\circ}$  vertical intervals and  $10^{\circ}$  horizontal intervals.

#### Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WROST CASE	277.02	60	0.070	18.0	0.930
NON-WROST CASE	120.01	60	0.148	17.7	0.995

#### Test Result

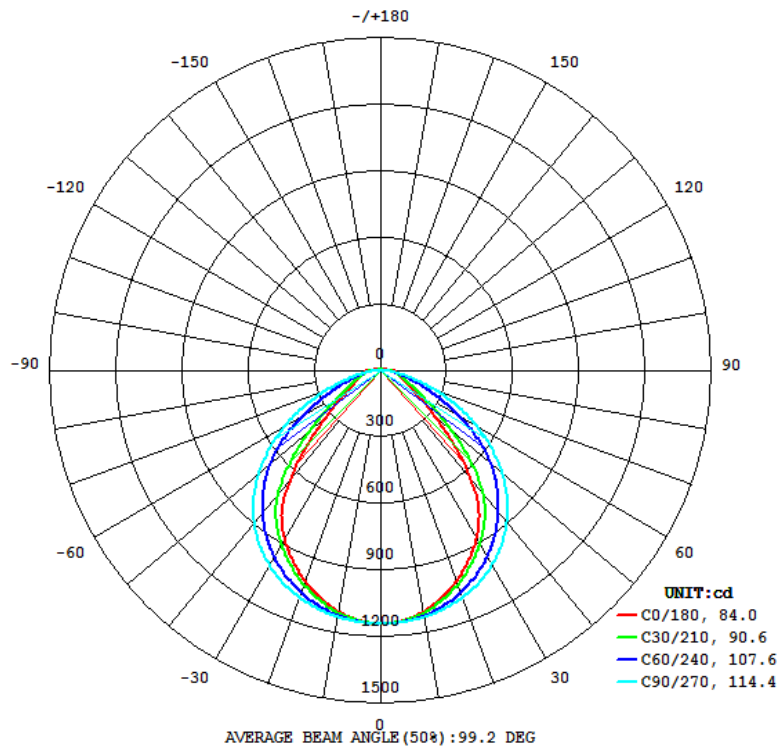
Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
2787	138.0	156.3	84.0	114.4	154.8

Zonal Lumen Requirement (0°-90°)	Zonal Lumen Requirement (0°-60°)	BUG rating	UGR (X=4H, Y=8H, 70/50/20%)
97.36%	82.38%	B1-U2-G1	22.5
Zonal Lumen Requirement (20°-50°)	Length(ft)	Lumen/ft	
54.06%	4	697	

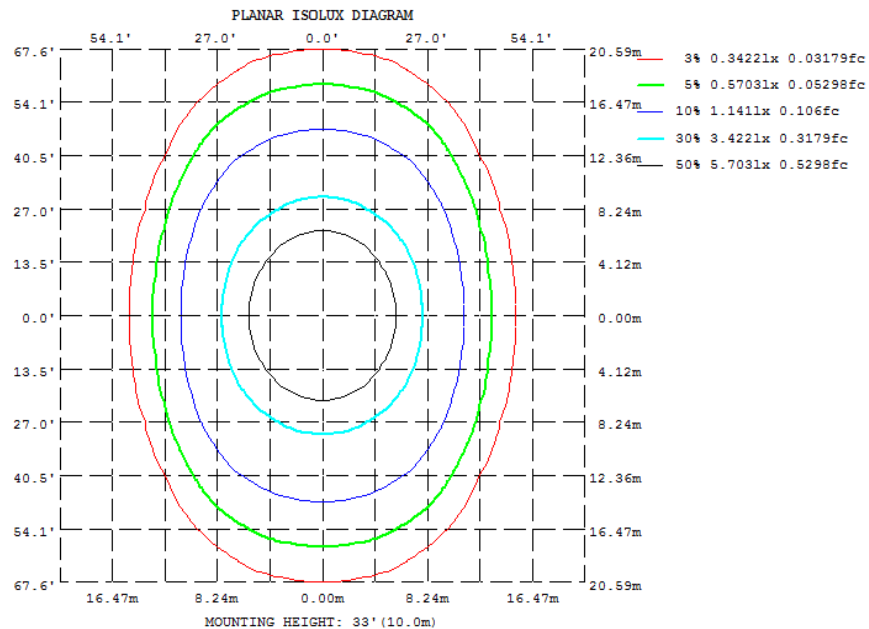


## 4.2 Goniophotometer Test

### Light Distrubtion Curve



### Isolux Plot



## 4.2 Goniophotometer Test

### Zonal Lumen Summary

$\gamma$	C0	C45	C90	C135	C180	C225	C270	C315
10	1105	1116	1129	1116	1105	1116	1129	1116
20	1009	1044	1087	1044	1009	1044	1087	1044
30	873.8	934.4	1012	934.4	873.8	934.4	1012	934.4
40	639.5	785.1	893.6	785.1	639.5	785.1	893.6	785.1
50	324.6	550.6	724.3	550.6	324.6	550.6	724.3	550.6
60	166.4	281.7	506.9	281.7	166.4	281.7	506.9	281.7
70	110.7	138.4	272.5	138.4	110.7	138.4	272.5	138.4
80	85.19	69.31	85.32	69.31	85.19	69.31	85.32	69.31
90	60.08	31.66	1.078	31.66	60.08	31.66	1.078	31.66
100	35.76	15.27	1.005	15.27	35.76	15.27	1.005	15.27
110	22.89	11.39	2.376	11.39	22.89	11.39	2.376	11.39
120	18.61	9.885	3.453	9.885	18.61	9.885	3.453	9.885
130	13.83	8.003	4.344	8.003	13.83	8.003	4.344	8.003
140	9.730	6.026	5.110	6.026	9.730	6.026	5.110	6.026
150	6.850	4.882	5.379	4.882	6.850	4.882	5.379	4.882
160	5.211	5.009	5.546	5.009	5.211	5.009	5.546	5.009
170	7.521	6.680	5.515	6.680	7.521	6.680	5.515	6.680
180	2.990	6.063	6.644	6.063	2.990	6.063	6.644	6.063
DEG	LUMINOUS INTENSITY:cd							

### UGR Table - Corrected

<b>UGR Table - Corrected</b>										
Reflectances										
Ceiling Cavity	70	70	50	50	30	70	70	50	50	30
Walls	50	30	50	30	30	50	30	50	30	30
Floor Cavity	20	20	20	20	20	20	20	20	20	20
Room Size										
X=2H Y=2H										
2H	20.3	21.8	20.7	22.1	22.5	14.7	16.2	15.1	16.6	16.9
3H	21.6	22.9	22.0	23.3	23.7	16.2	17.5	16.6	17.9	18.3
4H	21.9	23.1	22.4	23.6	24.0	17.0	18.2	17.4	18.7	19.1
6H	22.1	23.2	22.5	23.6	24.1	18.0	19.2	18.5	19.6	20.1
8H	22.1	23.2	22.5	23.6	24.1	18.6	19.7	19.1	20.1	20.6
12H	22.1	23.1	22.5	23.5	24.1	19.3	20.3	19.7	20.7	21.2
UGR Viewed Crosswise										
4H 2H	20.3	21.6	20.8	22.0	22.4	15.5	16.7	15.9	17.1	17.6
3H	21.8	22.8	22.2	23.2	23.7	17.1	18.1	17.5	18.6	19.0
4H	22.2	23.1	22.7	23.6	24.1	18.0	18.9	18.5	19.4	19.9
6H	22.4	23.2	23.0	23.7	24.3	19.1	19.9	19.6	20.4	21.0
8H	22.5	23.2	23.0	23.7	24.3	19.8	20.5	20.3	21.0	21.6
12H	22.5	23.2	23.0	23.7	24.2	20.5	21.2	21.1	21.7	22.3
UGR Viewed Endwise										
8H 4H	22.2	22.9	22.7	23.4	24.0	18.3	19.1	18.8	19.6	20.1
6H	22.5	23.1	23.0	23.7	24.2	19.5	20.2	20.1	20.7	21.3
8H	22.6	23.1	23.1	23.7	24.3	20.3	20.9	20.9	21.4	22.0
12H	22.6	23.1	23.2	23.6	24.3	21.2	21.7	21.8	22.3	22.9
Maximum UGR = 24.3										

## 4.2 Goniophotometer Test

### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	107.79	0 - 10	107.79	3.87%
10-20	306.41	0 - 20	414.20	14.86%
20-30	459.19	0 - 30	873.39	31.34%
30-40	540.94	0 - 40	1414.33	50.75%
40-50	506.55	0 - 50	1920.88	68.93%
50-60	374.97	0 - 60	2295.85	82.38%
60-70	234.61	0 - 70	2530.46	90.80%
70-80	126.39	0 - 80	2656.85	95.34%
80-90	56.49	0 - 90	2713.34	97.36%
90-100	25.32	0 - 100	2738.66	98.27%
100-110	14.66	0 - 110	2753.32	98.80%
110-120	10.95	0 - 120	2764.27	99.19%
120-130	8.30	0 - 130	2772.57	99.49%
130-140	5.66	0 - 140	2778.23	99.69%
140-150	3.83	0 - 150	2782.06	99.83%
150-160	2.53	0 - 160	2784.59	99.92%
160-170	1.63	0 - 170	2786.22	99.98%
170-180	0.62	0 - 180	2786.84	100.00%

## 4.2 Goniophotometer Test

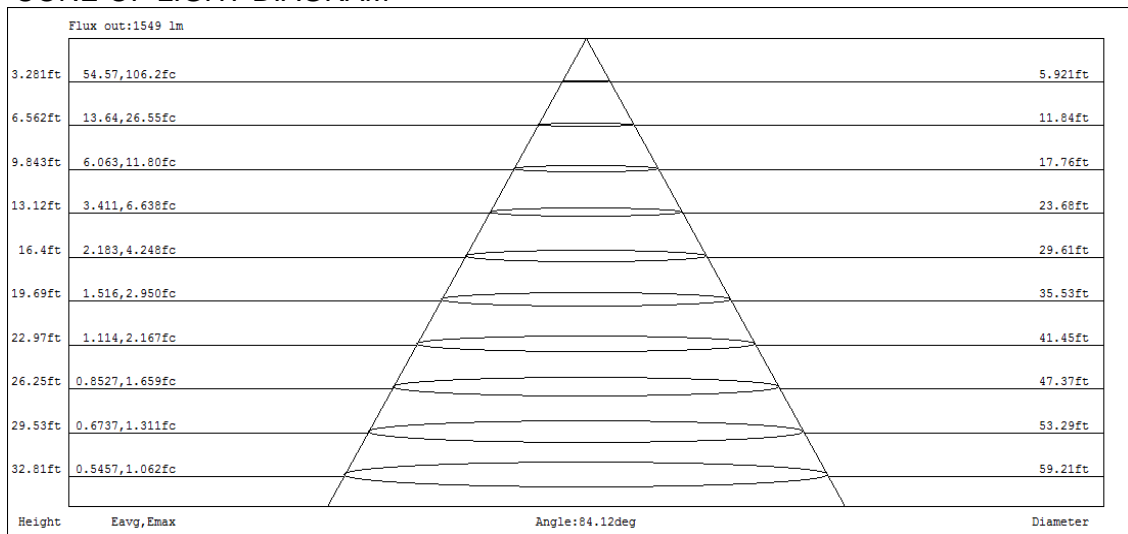
### COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

#### Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

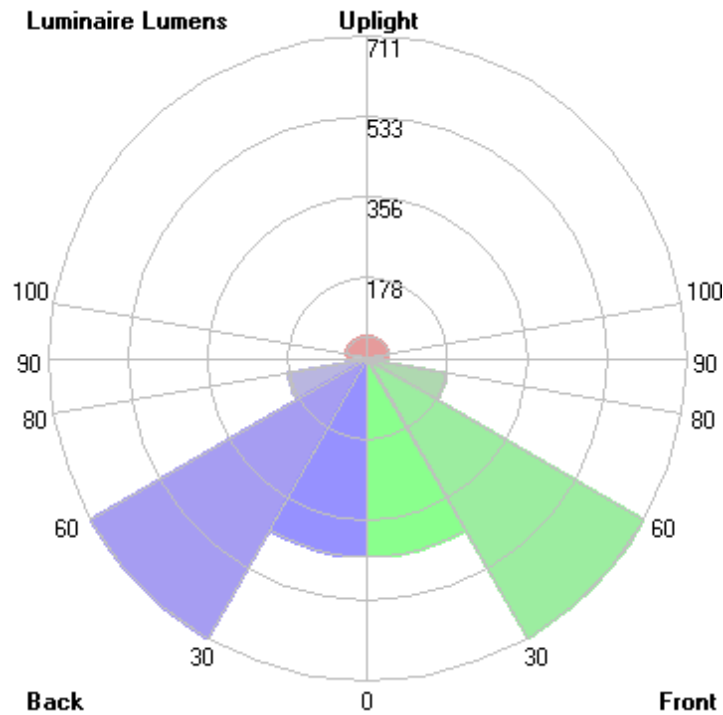
RC	80				70				50			30			10			0
R/W	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	118	118	118	118	115	115	115	115	110	110	110	104	104	104	100	100	100	97
1	109	105	101	97	106	102	98	95	97	94	92	93	91	88	89	87	85	83
2	100	92	86	81	97	90	84	79	86	81	77	83	79	75	79	76	73	71
3	92	82	74	68	89	80	73	67	77	71	66	74	69	65	71	67	63	61
4	84	73	65	59	82	72	64	58	69	62	57	66	61	56	64	59	55	53
5	78	66	57	51	76	65	57	51	62	55	50	60	54	49	58	53	48	46
6	72	60	51	45	70	59	51	45	57	49	44	55	48	44	53	47	43	41
7	67	54	46	40	65	53	45	40	52	45	39	50	44	39	48	43	39	37
8	63	50	42	36	61	49	41	36	47	40	35	46	40	35	45	39	35	33
9	59	46	38	33	57	45	38	32	44	37	32	43	36	32	41	36	31	30
10	55	42	35	30	54	42	34	29	41	34	29	39	33	29	38	33	29	27

### CONE OF LIGHT DIAGRAM



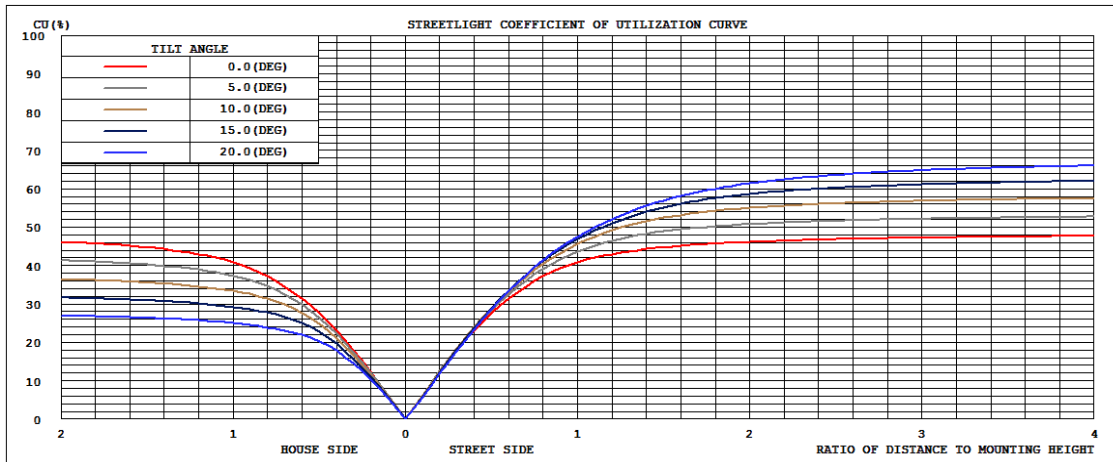
## 4.2 Goniophotometer Test

LCS/BUG

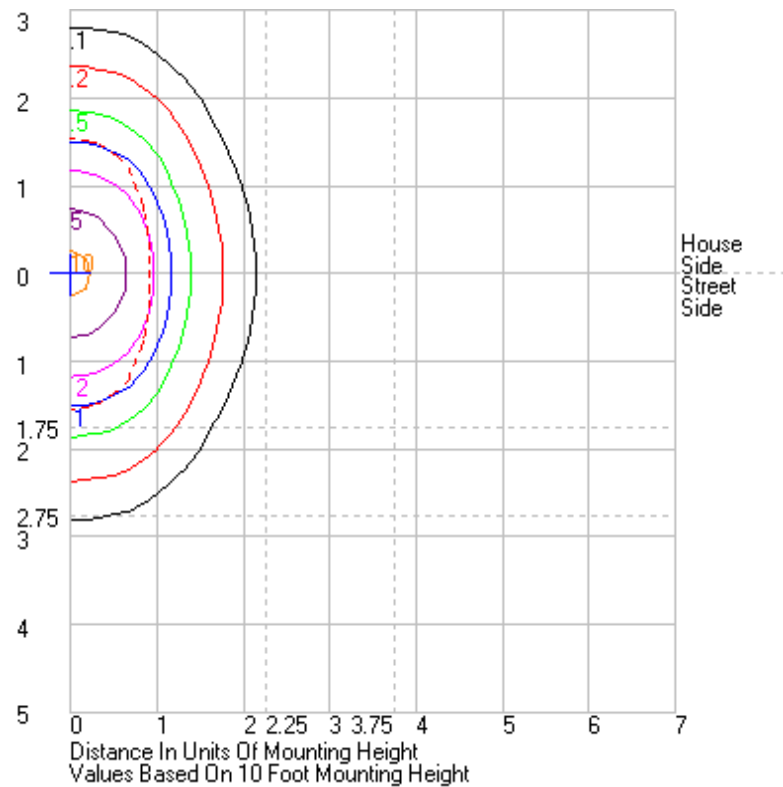


	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	436.7	N.A.	15.7
FM - Front-Medium (30-60)	711.2	N.A.	25.5
FH - Front-High (60-80)	180.5	N.A.	6.5
FVH - Front-Very High (80-90)	28.2	N.A.	1.0
BL - Back-Low (0-30)	436.7	N.A.	15.7
BM - Back-Medium (30-60)	711.2	N.A.	25.5
BH - Back-High (60-80)	180.5	N.A.	6.5
BVH - Back-Very High (80-90)	28.2	N.A.	1.0
UL - Uplight-Low (90-100)	25.3	N.A.	0.9
UH - Uplight-High (100-180)	48.2	N.A.	1.7
Total	2786.7	N.A.	100.0
BUG Rating	B1-U2-G1		

## Coefficients of Utilization



## Isolines



## 4.2 Goniophotometer Test

	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360
0	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26	1142.26
1	1141.3	1141.61	1142.22	1141.59	1141.91	1141.38	1140.64	1141.38	1141.91	1141.59	1142.22	1141.61	1141.3	1141.61	1142.22	1141.59	1141.91	1141.38	1140.64	1141.38	1141.91	1141.59	1142.22	1141.61	1141.3
2	1140.35	1140.57	1140.65	1139.99	1142	1139.9	1139.52	1139.9	1142	1139.99	1140.65	1140.57	1140.35	1140.57	1140.65	1139.99	1142	1139.9	1139.52	1139.9	1142	1139.99	1140.65	1140.57	1140.35
3	1140.27	1141.42	1140.84	1140.15	1138.82	1139.29	1138.57	1139.29	1138.82	1140.15	1140.84	1141.42	1140.27	1141.42	1140.84	1140.15	1138.82	1139.29	1138.57	1139.29	1138.82	1140.15	1140.84	1141.42	1140.27
4	1139.45	1140.53	1139.68	1138.61	1136.41	1136.66	1134.89	1136.66	1136.41	1138.61	1139.68	1140.53	1139.45	1140.53	1139.68	1138.61	1136.41	1136.66	1134.89	1136.66	1136.41	1138.61	1139.68	1140.53	1139.45
5	1137.46	1137.8	1136.39	1135.2	1135.03	1131.86	1131.71	1131.86	1135.03	1135.2	1136.39	1137.8	1137.46	1137.8	1136.39	1135.2	1135.03	1131.86	1131.71	1131.86	1135.03	1135.2	1136.39	1137.8	1137.46
6	1136.45	1136.46	1134.81	1132.08	1131.19	1128.97	1128.05	1128.97	1131.19	1132.08	1134.81	1136.46	1136.45	1136.46	1134.81	1132.08	1131.19	1128.97	1128.05	1128.97	1131.19	1132.08	1134.81	1136.46	1136.45
7	1135.16	1135.75	1133.63	1130.05	1125.98	1125.46	1123.23	1125.46	1125.98	1130.05	1133.63	1135.75	1135.16	1135.75	1133.63	1130.05	1125.98	1125.46	1123.23	1125.46	1125.98	1130.05	1133.63	1135.75	1135.16
8	1133.03	1132.86	1129.72	1126.05	1121.77	1118.85	1117.56	1118.85	1121.77	1126.05	1129.72	1132.86	1133.03	1132.86	1129.72	1126.05	1121.77	1118.85	1117.56	1118.85	1121.77	1126.05	1129.72	1132.86	1133.03
9	1130.53	1129.2	1125.41	1120.64	1117.61	1112.18	1111.05	1112.18	1117.61	1120.64	1125.41	1129.2	1130.53	1129.2	1125.41	1120.64	1117.61	1112.18	1111.05	1112.18	1117.61	1120.64	1125.41	1129.2	1130.53
10	1128.67	1127.37	1122.7	1116.3	1110.63	1107	1104.66	1107	1110.63	1116.3	1122.7	1127.37	1128.67	1127.37	1122.7	1116.3	1110.63	1107	1104.66	1107	1110.63	1116.3	1122.7	1127.37	1128.67
11	1125.81	1124.97	1119.66	1111.7	1103.66	1099.96	1096.6	1099.96	1103.66	1111.7	1119.66	1124.97	1125.81	1124.97	1119.66	1111.7	1103.66	1099.96	1096.6	1099.96	1103.66	1111.7	1119.66	1124.97	1125.81
12	1122.6	1119.72	1113.62	1105.81	1097.7	1091.17	1089.04	1091.17	1097.7	1105.81	1113.62	1119.72	1122.6	1119.72	1113.62	1105.81	1097.7	1091.17	1089.04	1091.17	1105.81	1113.62	1119.72	1122.6	1122.6
13	1118.8	1116.15	1108.62	1098.97	1090.85	1083.1	1080.21	1083.1	1090.85	1098.97	1108.62	1116.15	1118.8	1116.15	1108.62	1098.97	1090.85	1083.1	1080.21	1083.1	1090.85	1098.97	1108.62	1116.15	1118.8
14	1115.53	1113.38	1105.06	1092.75	1081.64	1075.64	1071.47	1075.64	1081.64	1092.75	1105.06	1113.38	1115.53	1113.38	1105.06	1092.75	1081.64	1075.64	1071.47	1075.64	1081.64	1092.75	1105.06	1113.38	1115.53
15	1111.47	1108.33	1098.86	1086.56	1073.46	1065.69	1062.4	1065.69	1073.46	1086.56	1098.86	1108.33	1111.47	1108.33	1098.86	1086.56	1073.46	1065.69	1062.4	1065.69	1073.46	1086.56	1098.86	1108.33	1111.47
16	1106.99	1102.12	1091.33	1077.98	1065.91	1055.21	1052.14	1055.21	1065.91	1077.98	1091.33	1102.12	1106.99	1102.12	1091.33	1077.98	1065.91	1055.21	1052.14	1055.21	1065.91	1077.98	1091.33	1102.12	1106.99
17	1102.37	1098.09	1086.02	1070.01	1056.2	1045.98	1041.49	1045.98	1056.2	1070.01	1086.02	1098.09	1102.37	1098.09	1086.02	1070.01	1056.2	1045.98	1041.49	1045.98	1056.2	1070.01	1086.02	1098.09	1102.37
18	1098.28	1094.03	1080.01	1062.92	1045.39	1035.62	1031.64	1035.62	1045.39	1062.92	1080.01	1094.03	1098.28	1094.03	1080.01	1062.92	1045.39	1035.62	1031.64	1035.62	1045.39	1062.92	1080.01	1094.03	1098.28
19	1092.43	1086.71	1071.83	1053.88	1036.41	1023.84	1020.49	1023.84	1036.41	1053.88	1071.83	1086.71	1092.43	1086.71	1071.83	1053.88	1036.41	1023.84	1020.49	1023.84	1036.41	1053.88	1071.83	1086.71	1092.43
20	1086.75	1080.36	1063.74	1044.14	1026.75	1012.88	1008.52	1012.88	1026.75	1044.14	1063.74	1080.36	1086.75	1080.36	1063.74	1044.14	1026.75	1012.88	1008.52	1012.88	1026.75	1044.14	1063.74	1080.36	1086.75
21	1081.18	1075.35	1057.27	1034.72	1014.71	1002.28	996.49	1002.28	1014.71	1034.72	1057.27	1075.35	1081.18	1075.35	1057.27	1034.72	1014.71	1002.28	996.49	1002.28	1014.71	1034.72	1057.27	1075.35	1081.18
22	1075.41	1068	1049.22	1025.87	1003.35	990.11	984.54	990.11	1003.35	1025.87	1049.22	1068	1075.41	1068	1049.22	1025.87	1003.35	990.11	984.54	990.11	1003.35	1025.87	1049.22	1068	1075.41
23	1068.61	1059.36	1039.15	1015.25	993.53	976.93	972.1	976.93	993.53	1015.25	1039.15	1059.36	1068.61	1059.36	1039.15	1015.25	993.53	976.93	972.1	976.93	993.53	1015.25	1039.15	1059.36	1068.61
24	1061.99	1053.06	1030.18	1003.96	981.92	964.77	958.96	964.77	981.92	1003.96	1030.18	1053.06	1061.99	1053.06	1030.18	1003.96	981.92	964.77	958.96	964.77	981.92	1003.96	1030.18	1053.06	1061.99
25	1055.41	1046.53	1022.67	993.61	968.05	952.6	946.13	952.6	968.05	993.61	1022.67	1046.53	1055.41	1046.53	1022.67	993.61	968.05	952.6	946.13	952.6	968.05	993.61	1022.67	1046.53	1055.41
26	1046.84	1036.56	1011.97	982.99	956.42	938.66	932.06	938.66	956.42	982.99	1011.97	1036.56	1046.84	1036.56	1011.97	982.99	956.42	938.66	932.06	938.66	956.42	982.99	1011.97	1036.56	1046.84
27	1038.69	1027.58	1000.48	970.82	944.34	924.41	918.07	924.41	944.34	970.82	1000.48	1027.58	1038.69	1027.58	1000.48	970.82	944.34	924.41	918.07	924.41	944.34	970.82	1000.48	1027.58	1038.69
28	1030.83	1019.86	991.27	958.71	930.58	911.26	903.67	911.26	930.58	958.71	991.27	1019.86	1030.83	1019.86	991.27	958.71	930.58	911.26	903.67	911.26	930.58	958.71	991.27	1019.86	1030.83
29	1022.21	1009.69	981.49	946.92	915.93	896.93	890.05	896.93	915.93	946.92	981.49	1009.69	1022.21	1009.69	981.49	946.92	915.93	896.93	890.05	896.93	915.93	946.92	981.49	1009.69	1022.21
30	1012.24	998.76	968.88	934.38	903.05	881.02	873.84	881.02	903.05	934.38	968.88	998.76	1012.24	998.76	968.88	934.38	903.05	881.02	873.84	881.02	903.05	934.38	968.88	998.76	1012.24
31	1003.12	989.35	957.07	920.83	889.06	866.25	858.28	866.25	889.06	920.83	957.07	989.35	1003.12	989.35	957.07	920.83	889.06	866.25	858.28	866.25	889.06	920.83	957.07	989.35	1003.12
32	993.45	979.2	945.95	907.47	872.9	850.92	841.89	850.92	872.9	907.47	945.95	979.2	993.45	979.2	945.95	907.47	872.9	850.92	841.89	850.92	872.9	907.47	945.95	979.2	993.45
33	981.94	967.12	933.56	893.89	858.24	834.03	823.53	834.03	858.24	893.89	933.56	967.12	981.94	967.12	933.56	893.89	858.24	834.03	823.53	834.03	858.24	893.89	933.56	967.12	981.94
34	970.28	954.64	919.96	879.71	843.6	815.96	804.21	815.96	843.6	879.71	919.96	954.64	970.28	954.64	919.96	879.71	843.6	815.96	804.21	815.96	843.6	879.71	919.96	954.64	970.28
35	959.93	943.89	907.03	864.51	826.41	796.67	783.1	796.67	826.41	864.51	907.03	943.89	959.93	943.89	907.03	864.51	826.41	796.67	783.1	796.67	826.41	864.51	907.03	943.89	959.93
36	947.98	931.78	894.06	849.87	809.12	775.34	760.11	775.34	809.12	849.87	894.06	931.78	947.98	931.78	894.06	849.87	809.12	775.34	760.11	775.34	809.12	849.87	894.06	931.78	947.98
37	934.29	917.26	879.53	834.97	791.11	750.66	732.79	750.66	791.11	834.97	879.53	917.26	934.29	917.26	879.53	834.97	791.11	750.66	732.79	750.66	791.11	834.97	879.53	917.26	934.29
38	921.61	903.78	864.52	818.5	771.94	724.49	704.27	724.49	771.94	818.5	864.52	903.78	921.61	903.78	864.52	818.5	771.94	724.49	704.27	724.49	771.94	818.5	864.52	903.78	921.61
39	909.03	891.05	850.1	801.76	749.23	695.66	672.52	695.66	749.23	801.76	850.1	891.05	909.03	891.05	850.1	801.76									



51	702.7	683.75	634.59	521.47	393.96	321.88	300.66	321.88	393.96	521.47	634.59	683.75	702.7	683.75	634.59	521.47	393.96	321.88	300.66	321.88	393.96	521.47	634.59	683.75	702.7
52	682.56	663.43	612.27	491.95	366.11	298.19	278.75	298.19	366.11	491.95	612.27	663.43	682.56	663.43	612.27	491.95	366.11	298.19	278.75	298.19	366.11	491.95	612.27	663.43	682.56
53	663	643.24	590.36	462.61	340.07	276.98	259.45	276.98	340.07	462.61	590.36	643.24	663	643.24	590.36	462.61	340.07	276.98	259.45	276.98	340.07	462.61	590.36	643.24	663
54	641.09	622.02	566.86	433.12	315.24	257.75	241.68	257.75	315.24	433.12	566.86	622.02	641.09	622.02	566.86	433.12	315.24	257.75	241.68	257.75	315.24	433.12	566.86	622.02	641.09
55	618.8	600.82	542.37	405.29	292.88	240.1	225.28	240.1	292.88	405.29	542.37	600.82	618.8	600.82	542.37	405.29	292.88	240.1	225.28	240.1	292.88	405.29	542.37	600.82	618.8
56	597.42	579.33	517.4	377.83	271.87	223.94	211.23	223.94	271.87	377.83	517.4	579.33	597.42	579.33	517.4	377.83	271.87	223.94	211.23	223.94	271.87	377.83	517.4	579.33	597.42
57	575.99	557.59	492.43	351.61	253.11	209.79	198.04	209.79	253.11	351.61	492.43	557.59	575.99	557.59	492.43	351.61	253.11	209.79	198.04	209.79	253.11	351.61	492.43	557.59	575.99
58	552.16	535.68	466.08	326.34	235.82	196.9	186.13	196.9	235.82	326.34	466.08	535.68	552.16	535.68	466.08	326.34	235.82	196.9	186.13	196.9	235.82	326.34	466.08	535.68	552.16
59	529.16	513.16	439.85	303.21	219.81	185	175.92	185	219.81	303.21	439.85	513.16	529.16	513.16	439.85	303.21	219.81	185	175.92	185	219.81	303.21	439.85	513.16	529.16
60	506.88	490.57	414.28	281.73	205.86	174.41	166.35	174.41	205.86	281.73	414.28	490.57	506.88	490.57	414.28	281.73	205.86	174.41	166.35	174.41	205.86	281.73	414.28	490.57	506.88
61	482.78	467.7	388.21	261.16	192.7	164.8	157.84	164.8	192.7	261.16	388.21	467.7	482.78	467.7	388.21	261.16	192.7	164.8	157.84	164.8	192.7	261.16	388.21	467.7	482.78
62	458.18	444.69	362.38	242.77	180.92	156.14	150.37	156.14	180.92	242.77	362.38	444.69	458.18	444.69	362.38	242.77	180.92	156.14	150.37	156.14	180.92	242.77	362.38	444.69	458.18
63	435.07	421.25	337.77	225.91	169.94	148.23	143.31	148.23	169.94	225.91	337.77	421.25	435.07	421.25	337.77	225.91	169.94	148.23	143.31	148.23	169.94	225.91	337.77	421.25	435.07
64	411.81	398.2	313.66	209.98	160.01	141.32	137.33	141.32	160.01	209.98	313.66	398.2	411.81	398.2	313.66	209.98	160.01	141.32	137.33	141.32	160.01	209.98	313.66	398.2	411.81
65	387.5	375.1	290.69	195.56	150.97	135.13	131.67	135.13	150.97	195.56	290.69	375.1	387.5	375.1	290.69	195.56	150.97	135.13	131.67	135.13	150.97	195.56	290.69	375.1	387.5
66	363.52	352.01	268.58	182.29	142.55	129.24	126.4	129.24	142.55	182.29	268.58	352.01	363.52	352.01	268.58	182.29	142.55	129.24	126.4	129.24	142.55	182.29	268.58	352.01	363.52
67	341.08	329.03	248.18	170.14	135.22	123.81	121.88	123.81	135.22	170.14	248.18	329.03	341.08	329.03	248.18	170.14	135.22	123.81	121.88	123.81	135.22	170.14	248.18	329.03	341.08
68	317.91	306.42	228.81	158.39	128.11	119.18	117.91	119.18	128.11	158.39	228.81	306.42	317.91	306.42	228.81	158.39	128.11	119.18	117.91	119.18	128.11	158.39	228.81	306.42	317.91
69	294.56	284.53	210.58	148	121.47	114.77	114.14	114.77	121.47	148	210.58	284.53	294.56	284.53	210.58	148	121.47	114.14	114.77	121.47	148	210.58	284.53	294.56	
70	272.52	262.69	194.06	138.36	115.73	110.71	110.71	110.71	115.73	138.36	194.06	262.69	272.52	262.69	194.06	138.36	115.73	110.71	110.71	110.71	115.73	138.36	194.06	262.69	272.52
71	250.78	241.29	178.32	129.29	110.31	107.11	107.58	107.11	110.31	129.29	178.32	241.29	250.78	241.29	178.32	129.29	110.31	107.11	107.58	107.11	110.31	129.29	178.32	241.29	250.78
72	229.21	220.88	163.59	120.67	105.16	103.73	104.71	103.73	105.16	120.67	163.59	220.88	229.21	220.88	163.59	120.67	105.16	103.73	104.71	103.73	105.16	120.67	163.59	220.88	229.21
73	208.49	201.13	149.82	112.67	100.34	100.38	101.94	100.38	100.34	112.67	149.82	201.13	208.49	201.13	149.82	112.67	100.34	100.38	101.94	100.38	100.34	112.67	149.82	201.13	208.49
74	188.86	181.92	137.06	105.37	96.04	97.4	99.23	97.4	96.04	105.37	137.06	181.92	188.86	181.92	137.06	105.37	96.04	97.4	99.23	97.4	96.04	105.37	137.06	181.92	188.86
75	169.57	163.7	125.17	98.31	91.81	94.61	96.86	94.61	91.81	98.31	125.17	163.7	169.57	163.7	125.17	98.31	91.81	94.61	96.86	94.61	91.81	98.31	125.17	163.7	169.57
76	150.93	146.57	114.01	91.8	87.73	91.83	94.39	91.83	87.73	91.8	114.01	146.57	150.93	146.57	114.01	91.8	87.73	91.83	94.39	91.83	87.73	91.8	114.01	146.57	150.93
77	133.53	130.14	103.37	85.81	83.99	89.1	91.98	89.1	83.99	85.81	103.37	130.14	133.53	130.14	103.37	85.81	83.99	89.1	91.98	89.1	83.99	85.81	103.37	130.14	133.53
78	116.36	114.69	93.48	79.99	80.43	86.58	89.8	86.58	80.43	79.99	93.48	114.69	116.36	114.69	93.48	79.99	80.43	86.58	89.8	86.58	80.43	79.99	93.48	114.69	116.36
79	100.39	100.17	84.36	74.45	76.93	84.04	87.45	84.04	76.93	74.45	84.36	100.17	100.39	100.17	84.36	74.45	76.93	84.04	87.45	84.04	76.93	74.45	84.36	100.17	100.39
80	85.32	86.92	75.9	69.31	73.48	81.39	85.19	81.39	73.48	69.31	75.9	86.92	85.32	86.92	75.9	69.31	73.48	81.39	85.19	81.39	73.48	69.31	75.9	86.92	85.32
81	71.85	74.32	67.78	64.48	70.27	78.87	82.73	78.87	70.27	64.48	67.78	74.32	71.85	74.32	67.78	64.48	70.27	78.87	82.73	78.87	70.27	64.48	67.78	74.32	71.85
82	58.72	62.82	60.2	59.8	67.15	76.38	80.53	76.38	67.15	59.8	60.2	62.82	58.72	62.82	60.2	59.8	67.15	76.38	80.53	76.38	67.15	59.8	60.2	62.82	58.72
83	46.46	52.46	53.56	55.52	63.98	74.01	78.73	74.01	63.98	55.52	53.56	52.46	46.46	52.46	53.56	55.52	63.98	74.01	78.73	74.01	63.98	55.52	53.56	52.46	46.46
84	35.64	42.7	47.19	51.38	60.98	71.38	75.99	71.38	60.98	51.38	47.19	42.7	35.64	42.7	47.19	51.38	60.98	71.38	75.99	71.38	60.98	51.38	47.19	42.7	35.64
85	25.95	34.19	41.25	47.49	58.31	68.87	73.38	68.87	58.31	47.49	41.25	34.19	25.95	34.19	41.25	47.49	58.31	68.87	73.38	68.87	58.31	47.49	41.25	34.19	25.95
86	17.75	26.85	36.06	43.86	55.36	66.33	70.86	66.33	55.36	43.86	36.06	26.85	17.75	26.85	36.06	43.86	55.36	66.33	70.86	66.33	55.36	43.86	36.06	26.85	17.75
87	11.99	20.7	31.47	40.48	52.43	63.65	68.27	63.65	52.43	40.48	31.47	20.7	11.99	20.7	31.47	40.48	52.43	63.65	68.27	63.65	52.43	40.48	31.47	20.7	11.99
88	6.77	15.86	27.37	37.4	49.72	61.05	65.49	61.05	49.72	37.4	27.37	15.86	6.77	15.86	27.37	37.4	49.72	61.05	65.49	61.05	49.72	37.4	27.37	15.86	6.77
89	3.12	11.91	23.8	34.44	46.99	58.29	62.85	58.29	46.99	34.44	23.8	11.91	3.12	11.91	23.8	34.44	46.99	58.29	62.85	58.29	46.99	34.44	23.8	11.91	3.12
90	1.08	9.15	20.75	31.66	44.29	55.48	60.08	55.48	44.29	31.66	20.75	9.15	1.08	9.15	20.75	31.66	44.29	55.48	60.08	55.48	44.29	31.66	20.75	9.15	1.08
91	0.15	7.07	18.22	29.15	41.73	52.8	57.21	52.8	41.73	29.15	18.22	7.07	0.15	7.07	18.22	29.15	41.73	52.8	57.21	52.8	41.73	29.15	18.22	7.07	0.15
92	0.1	5.51	16.07	26.86	39.23	50.12	54.58	50.12	39.23	26.86	16.07	5.51	0.1	5.51	16.07	26.86	39.23	50.12	54.58	50.12	39.23	26.86	16.07	5.51	0.1
93	0.12	4.65	14.25	24.8	36.91	47.52	51.89	47.52	36.91	24.8	14.25	4.65	0.12	4.65	14.25	24.8	36.91	47.52	51.89	47.52	36.91	24.8	14.25	4.65	0.12
94	0.17	4.1	12.83	22.9	34.68	45.04	49.19	45.04	34.68	22.9	12.83	4.1	0.17	4.1	12.83	22.9	34.68	45.04	49.19	45.04	34.68	22.9	12.83	4.1	0.17
95	0.24	3.73	11.69	21.25	32.61	42.66	46.7	42.66	32.61	21.25	11.69	3.73	0.24	3.73	11.69	21.25	32.61	42.66	46.7						

106	1.89	2.88	6.92	12.26	18.3	23.93	26.31	23.93	18.3	12.26	6.92	2.88	1.89	2.88	6.92	12.26	18.3	23.93	26.31	23.93	18.3	12.26	6.92	2.88	1.89
107	2.02	2.85	6.83	12	17.78	23	25.25	23	17.78	12	6.83	2.85	2.02	2.85	6.83	12	17.78	23	25.25	23	17.78	12	6.83	2.85	2.02
108	2.14	2.82	6.76	11.76	17.33	22.26	24.3	22.26	17.33	11.76	6.76	2.82	2.14	2.82	6.76	11.76	17.33	22.26	24.3	22.26	17.33	11.76	6.76	2.82	2.14
109	2.26	2.79	6.69	11.56	16.98	21.65	23.47	21.65	16.98	11.56	6.69	2.79	2.26	2.79	6.69	11.56	16.98	21.65	23.47	21.65	16.98	11.56	6.69	2.79	2.26
110	2.38	2.75	6.63	11.39	16.69	21.15	22.89	21.15	16.69	11.39	6.63	2.75	2.38	2.75	6.63	11.39	16.69	21.15	22.89	21.15	16.69	11.39	6.63	2.75	2.38
111	2.49	2.73	6.54	11.22	16.42	20.75	22.45	20.75	16.42	11.22	6.54	2.73	2.49	2.73	6.54	11.22	16.42	20.75	22.45	20.75	16.42	11.22	6.54	2.73	2.49
112	2.6	2.71	6.46	11.05	16.17	20.43	22.04	20.43	16.17	11.05	6.46	2.71	2.6	2.71	6.46	11.05	16.17	20.43	22.04	20.43	16.17	11.05	6.46	2.71	2.6
113	2.71	2.69	6.38	10.89	15.92	20.1	21.74	20.1	15.92	10.89	6.38	2.69	2.71	2.69	6.38	10.89	15.92	20.1	21.74	20.1	15.92	10.89	6.38	2.69	2.71
114	2.83	2.69	6.3	10.71	15.67	19.72	21.43	19.72	15.67	10.71	6.3	2.69	2.83	2.69	6.3	10.71	15.67	19.72	21.43	19.72	15.67	10.71	6.3	2.69	2.83
115	2.95	2.68	6.22	10.52	15.42	19.33	20.99	19.33	15.42	10.52	6.22	2.68	2.95	2.68	6.22	10.52	15.42	19.33	20.99	19.33	15.42	10.52	6.22	2.68	2.95
116	3.06	2.69	6.14	10.36	15.17	18.92	20.48	18.92	15.17	10.36	6.14	2.69	3.06	2.69	6.14	10.36	15.17	18.92	20.48	18.92	15.17	10.36	6.14	2.69	3.06
117	3.17	2.7	6.07	10.24	14.95	18.54	19.98	18.54	14.95	10.24	6.07	2.7	3.17	2.7	6.07	10.24	14.95	18.54	19.98	18.54	14.95	10.24	6.07	2.7	3.17
118	3.26	2.71	5.99	10.12	14.73	18.15	19.52	18.15	14.73	10.12	5.99	2.71	3.26	2.71	5.99	10.12	14.73	18.15	19.52	18.15	14.73	10.12	5.99	2.71	3.26
119	3.36	2.73	5.89	10	14.49	17.8	19.05	17.8	14.49	10	5.89	2.73	3.36	2.73	5.89	10	14.49	17.8	19.05	17.8	14.49	10	5.89	2.73	3.36
120	3.45	2.74	5.8	9.88	14.24	17.46	18.61	17.46	14.24	9.88	5.8	2.74	3.45	2.74	5.8	9.88	14.24	17.46	18.61	17.46	14.24	9.88	5.8	2.74	3.45
121	3.54	2.77	5.71	9.76	13.98	17.07	18.21	17.07	13.98	9.76	5.71	2.77	3.54	2.77	5.71	9.76	13.98	17.07	18.21	17.07	13.98	9.76	5.71	2.77	3.54
122	3.62	2.8	5.61	9.62	13.69	16.67	17.76	16.67	13.69	9.62	5.61	2.8	3.62	2.8	5.61	9.62	13.69	16.67	17.76	16.67	13.69	9.62	5.61	2.8	3.62
123	3.7	2.83	5.51	9.44	13.36	16.27	17.31	16.27	13.36	9.44	5.51	2.83	3.7	2.83	5.51	9.44	13.36	16.27	17.31	16.27	13.36	9.44	5.51	2.83	3.7
124	3.79	2.86	5.42	9.27	13.01	15.85	16.86	15.85	13.01	9.27	5.42	2.86	3.79	2.86	5.42	9.27	13.01	15.85	16.86	15.85	13.01	9.27	5.42	2.86	3.79
125	3.9	2.89	5.33	9.09	12.64	15.39	16.37	15.39	12.64	9.09	5.33	2.89	3.9	2.89	5.33	9.09	12.64	15.39	16.37	15.39	12.64	9.09	5.33	2.89	3.9
126	4	2.93	5.23	8.87	12.29	14.94	15.85	14.94	12.29	8.87	5.23	2.93	4	2.93	5.23	8.87	12.29	14.94	15.85	14.94	12.29	8.87	5.23	2.93	4
127	4.09	2.96	5.14	8.67	11.96	14.5	15.36	14.5	11.96	8.67	5.14	2.96	4.09	2.96	5.14	8.67	11.96	14.5	15.36	14.5	11.96	8.67	5.14	2.96	4.09
128	4.18	3	5.04	8.45	11.64	14.05	14.86	14.05	11.64	8.45	5.04	3	4.18	3	5.04	8.45	11.64	14.05	14.86	14.05	11.64	8.45	5.04	3	4.18
129	4.26	3.03	4.95	8.23	11.31	13.59	14.34	13.59	11.31	8.23	4.95	3.03	4.26	3.03	4.95	8.23	11.31	13.59	14.34	13.59	11.31	8.23	4.95	3.03	4.26
130	4.34	3.09	4.86	8	10.98	13.15	13.83	13.15	10.98	8	4.86	3.09	4.34	3.09	4.86	8	10.98	13.15	13.83	13.15	10.98	8	4.86	3.09	4.34
131	4.42	3.14	4.78	7.78	10.65	12.71	13.37	12.71	10.65	7.78	4.78	3.14	4.42	3.14	4.78	7.78	10.65	12.71	13.37	12.71	10.65	7.78	4.78	3.14	4.42
132	4.5	3.21	4.7	7.56	10.32	12.27	12.9	12.27	10.32	7.56	4.7	3.21	4.5	3.21	4.7	7.56	10.32	12.27	12.9	12.27	10.32	7.56	4.7	3.21	4.5
133	4.58	3.29	4.62	7.34	9.99	11.85	12.44	11.85	9.99	7.34	4.62	3.29	4.58	3.29	4.62	7.34	9.99	11.85	12.44	11.85	9.99	7.34	4.62	3.29	4.58
134	4.66	3.37	4.55	7.13	9.64	11.44	12.02	11.44	9.64	7.13	4.55	3.37	4.66	3.37	4.55	7.13	9.64	11.44	12.02	11.44	9.64	7.13	4.55	3.37	4.66
135	4.74	3.47	4.5	6.92	9.29	11.04	11.6	11.04	9.29	6.92	4.5	3.47	4.74	3.47	4.5	6.92	9.29	11.04	11.6	11.04	9.29	6.92	4.5	3.47	4.74
136	4.83	3.59	4.46	6.73	8.97	10.64	11.2	10.64	8.97	6.73	4.46	3.59	4.83	3.59	4.46	6.73	8.97	10.64	11.2	10.64	8.97	6.73	4.46	3.59	4.83
137	4.91	3.75	4.41	6.54	8.65	10.24	10.8	10.24	8.65	6.54	4.41	3.75	4.91	3.75	4.41	6.54	8.65	10.24	10.8	10.24	8.65	6.54	4.41	3.75	4.91
138	4.98	3.97	4.37	6.36	8.36	9.86	10.44	9.86	8.36	6.36	4.37	3.97	4.98	3.97	4.37	6.36	8.36	9.86	10.44	9.86	8.36	6.36	4.37	3.97	4.98
139	5.04	4.24	4.34	6.19	8.09	9.51	10.08	9.51	8.09	6.19	4.34	4.24	5.04	4.24	4.34	6.19	8.09	9.51	10.08	9.51	8.09	6.19	4.34	4.24	5.04
140	5.11	4.53	4.31	6.03	7.83	9.18	9.73	9.18	7.83	6.03	4.31	4.53	5.11	4.53	4.31	6.03	7.83	9.18	9.73	9.18	7.83	6.03	4.31	4.53	5.11
141	5.18	4.81	4.28	5.86	7.57	8.88	9.39	8.88	7.57	5.86	4.28	4.81	5.18	4.81	4.28	5.86	7.57	8.88	9.39	8.88	7.57	5.86	4.28	4.81	5.18
142	5.24	5.06	4.26	5.71	7.33	8.6	9.07	8.6	7.33	5.71	4.26	5.06	5.24	5.06	4.26	5.71	7.33	8.6	9.07	8.6	7.33	5.71	4.26	5.06	5.24
143	5.28	5.3	4.24	5.58	7.1	8.31	8.76	8.31	7.1	5.58	4.24	5.3	5.28	5.3	4.24	5.58	7.1	8.31	8.76	8.31	7.1	5.58	4.24	5.3	5.28
144	5.31	5.54	4.22	5.45	6.87	8.03	8.45	8.03	6.87	5.45	4.22	5.54	5.31	5.54	4.22	5.45	6.87	8.03	8.45	8.03	6.87	5.45	4.22	5.54	5.31
145	5.32	5.75	4.21	5.34	6.65	7.75	8.16	7.75	6.65	5.34	4.21	5.75	5.32	5.75	4.21	5.34	6.65	7.75	8.16	7.75	6.65	5.34	4.21	5.75	5.32
146	5.34	5.91	4.2	5.23	6.44	7.5	7.88	7.5	6.44	5.23	4.2	5.91	5.34	5.91	4.2	5.23	6.44	7.5	7.88	7.5	6.44	5.23	4.2	5.91	5.34
147	5.37	6.05	4.19	5.14	6.26	7.24	7.6	7.24	6.26	5.14	4.19	6.05	5.37	6.05	4.19	5.14	6.26	7.24	7.6	7.24	6.26	5.14	4.19	6.05	5.37
148	5.39	6.16	4.21	5.04	6.09	6.99	7.34	6.99	6.09	5.04	4.21	6.16	5.39	6.16	4.21	5.04	6.09	6.99	7.34	6.99	6.09	5.04	4.21	6.16	5.39
149	5.39	6.23	4.24	4.96	5.93	6.75	7.08	6.75	5.93	4.96	4.24	6.23	5.39	6.23	4.24	4.96	5.93	6.75	7.08	6.75	5.93	4.96	4.24	6.23	5.39
150	5.38	6.28	4.28	4.88	5.78	6.54	6.85	6.54	5.78	4.88	4.28	6.28	5.38	6.28	4.28	4.88	5.78	6.54	6.85	6.54	5.78	4.88	4.28	6.28	5.38
151	5.38	6.31	4.34	4.81	5.63	6.33	6.62	6.33	5.63	4.81	4.34	6.31	5.38	6.31	4.34	4.81	5.63	6.33	6.62	6.33	5.63	4.81	4.34	6.31	5.38
152	5.39	6.34	4.41	4.75	5.5	6.14	6.42	6.14	5.5	4.75	4.41	6.34	5.39	6.34	4.41	4.75	5.5	6.14	6.42	6.14	5.5	4.75	4.41	6.34	5.39
153	5.42	6.35	4.6	4.7	5.38	5.97	6.22	5.97	5.38	4.7	4.6	6.35	5.42	6.35	4.6	4.7	5.38	5.97	6.22	5.97	5.38	4.7	4.6	6.35	5.42
154	5.46	6.36	4.91	4.64	5.26	5.8	6.04	5.8	5.26	4.64	4.91	6.36	5.46	6.36	4.91	4.64	5.26	5.8	6.04	5.8	5.26	4.64	4.91	6.36	5.46
155	5.48	6.4	5.21	4.58	5.16	5.65	5.88	5.65	5.16	4.58	5.21	6.4	5.48	6.4	5.21	4.58	5.16	5.65	5.88	5.65	5.16	4.58	5.21	6.4	5.48
156	5.49	6.36	5.54	4.55	5.06	5.51	5.72	5.																	



161	5.55	6.04	6.38	5.31	4.72	4.96	5.11	4.96	4.72	5.31	6.38	6.04	5.55	6.04	6.38	5.31	4.72	4.96	5.11	4.96	4.72	5.31	6.38	6.04	5.55
162	5.53	5.9	6.36	5.6	4.77	4.9	5.04	4.9	4.77	5.6	6.36	5.9	5.53	5.9	6.36	5.6	4.77	4.9	5.04	4.9	4.77	5.6	6.36	5.9	5.53
163	5.48	5.84	6.36	5.87	4.98	4.85	5.01	4.85	4.98	5.87	6.36	5.84	5.48	5.84	6.36	5.87	4.98	4.85	5.01	4.85	4.98	5.87	6.36	5.84	5.48
164	5.41	5.82	6.39	6.11	5.29	4.87	5.01	4.87	5.29	6.11	6.39	5.82	5.41	5.82	6.39	6.11	5.29	4.87	5.01	4.87	5.29	6.11	6.39	5.82	5.41
165	5.36	5.77	6.36	6.31	5.63	5.04	5.07	5.04	5.63	6.31	6.36	5.77	5.36	5.77	6.36	6.31	5.63	5.04	5.07	5.04	5.63	6.31	6.36	5.77	5.36
166	5.32	5.74	6.35	6.43	5.98	5.46	5.28	5.46	5.98	6.43	6.35	5.74	5.32	5.74	6.35	6.43	5.98	5.46	5.28	5.46	5.98	6.43	6.35	5.74	5.32
167	5.26	5.68	6.31	6.47	6.25	6.01	5.83	6.01	6.25	6.47	6.31	5.68	5.26	5.68	6.31	6.47	6.25	6.01	5.83	6.01	6.25	6.47	6.31	5.68	5.26
168	5.27	5.68	6.28	6.5	6.43	6.39	6.51	6.39	6.43	6.5	6.28	5.68	5.27	5.68	6.28	6.5	6.43	6.39	6.51	6.39	6.43	6.5	6.28	5.68	5.27
169	5.38	5.74	6.36	6.58	6.54	6.61	7.07	6.61	6.54	6.58	6.36	5.74	5.38	5.74	6.36	6.58	6.54	6.61	7.07	6.61	6.54	6.58	6.36	5.74	5.38
170	5.52	5.8	6.42	6.68	6.61	6.77	7.52	6.77	6.61	6.68	6.42	5.8	5.52	5.8	6.42	6.68	6.61	6.77	7.52	6.77	6.61	6.68	6.42	5.8	5.52
171	5.68	5.84	6.39	6.77	6.68	6.77	7.87	6.77	6.68	6.77	6.39	5.84	5.68	5.84	6.39	6.77	6.68	6.77	7.87	6.77	6.68	6.77	6.39	5.84	5.68
172	5.86	5.94	6.36	6.76	6.72	6.61	8.08	6.61	6.72	6.76	6.36	5.94	5.86	5.94	6.36	6.76	6.72	6.61	8.08	6.61	6.72	6.76	6.36	5.94	5.86
173	6.01	6.02	6.35	6.69	6.77	6.61	8.07	6.61	6.77	6.69	6.35	6.02	6.01	6.02	6.35	6.69	6.77	6.61	8.07	6.61	6.77	6.69	6.35	6.02	6.01
174	6.1	6.16	6.27	6.5	6.68	6.59	7.31	6.59	6.68	6.5	6.27	6.16	6.1	6.16	6.27	6.5	6.68	6.59	7.31	6.59	6.68	6.5	6.27	6.16	6.1
175	6.18	6.26	6.22	6.44	6.62	6.42	7.01	6.42	6.62	6.44	6.22	6.26	6.18	6.26	6.22	6.44	6.62	6.42	7.01	6.42	6.62	6.44	6.22	6.26	6.18
176	6.34	6.36	6.37	6.38	6.41	6.25	5.87	6.25	6.41	6.38	6.37	6.36	6.34	6.36	6.37	6.38	6.41	6.25	5.87	6.25	6.41	6.38	6.37	6.36	6.34
177	6.55	6.5	6.46	6.48	6.27	5.8	4.88	5.8	6.27	6.48	6.46	6.5	6.55	6.5	6.46	6.48	6.27	5.8	4.88	5.8	6.27	6.48	6.46	6.5	6.55
178	6.69	6.63	6.54	6.46	6.17	5.48	3.83	5.48	6.17	6.46	6.54	6.63	6.69	6.63	6.54	6.46	6.17	5.48	3.83	5.48	6.17	6.46	6.54	6.63	6.69
179	6.67	6.62	6.47	6.27	5.99	5.01	2.76	5.01	5.99	6.27	6.47	6.62	6.67	6.62	6.47	6.27	5.99	5.01	2.76	5.01	5.99	6.27	6.47	6.62	6.67
180	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64

## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

Model No.	CS4 @50% Power /5000K	Sample ID.	U1
Temperature (°C)	25.1	Humidity (%RH)	57.0

#### Test Method

The samples were tested according to the ANSI C82.77:2014.

The total harmonic distortion shall be measured to the 40th order.

The ambient temperature condition was maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

#### Test Results

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
120.07	60	0.148	17.7	0.995	5.58%
276.99	60	0.070	18.0	0.930	8.87%

## 5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2022/12/24	2023/12/23
DLF108	Auxiliary Lamp	2022/12/24	2023/12/23
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-directional	2022/12/24	2023/12/23
DLF116	AC Power Source	2022/12/16	2023/12/15
DLF516	Power Meter	2022/12/16	2023/12/15
DLF112	Temperature Recorder	2022/12/28	2023/12/27
DLF114	Temperature & Humidity Datalogger	2022/12/28	2023/12/27
DLF101	Goniophotometer	2022/12/24	2023/12/23
DLF511	AC Power Source	2022/12/16	2023/12/15
DLF512	AC Power Source	2022/12/16	2023/12/15
DLF513	AC Power Source	2022/12/16	2023/12/15
DLF507	DC Power Source	2022/12/16	2023/12/15
DLF111	Temperature & Humidity Datalogger	2022/12/28	2023/12/27
DLF119	Power Meter	2022/12/16	2023/12/15
DLF031	Temperature data logger	2023/6/22	2024/6/21
DLF073	Power Analyzer	2023/6/22	2024/6/21
DLF003	Temperature & Humidity Datalogger	2023/6/22	2024/6/21

\*\*\*\*\* End of Test Report\*\*\*\*\*