

Photometric Test Report

Relevant Standards

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

Prepared For RAB Lighting Inc.

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Report Number

DLF2310103-23a

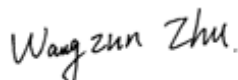
Test Date

2023/10/23

Issue Date

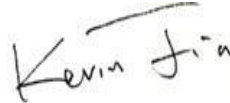
2023/10/24

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

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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		4071
Lumen/ft (Goniophotometer - Section 4.2)	IES LM-79-2008	≥375		1018
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 115	Premium 130	157.2
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		25.9
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	5.22%
		20.00%	277V	7.45%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.996
		0.9	277V	0.959
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3985±275	4204
		4 step	3985±154	
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		19
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		85
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%		-11%
Zonal Lumen Requirement (0°-90°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≥85%		97.39%
Zonal Lumen Requirement (0°-60°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≥40%		82.43%
Zonal Lumen Requirement (20°-50°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≥30%		54.17%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22 <25		23.8
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		277
(Goniophotometer - Section 4.2)		Non-Wrost Case		120
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		0.097
(Goniophotometer - Section 4.2)		Non-Wrost Case		0.216
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		25.9
(Goniophotometer - Section 4.2)		Non-Wrost Case		25.8

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023/10/23	CS4 @75% Power /4000K	W1
2	Goniophotometer Test	2023/10/23	CS4 @75% Power /4000K	W1
3	THD and PF Test	2023/10/23	CS4 @75% Power /4000K	W1

Remark(If any)

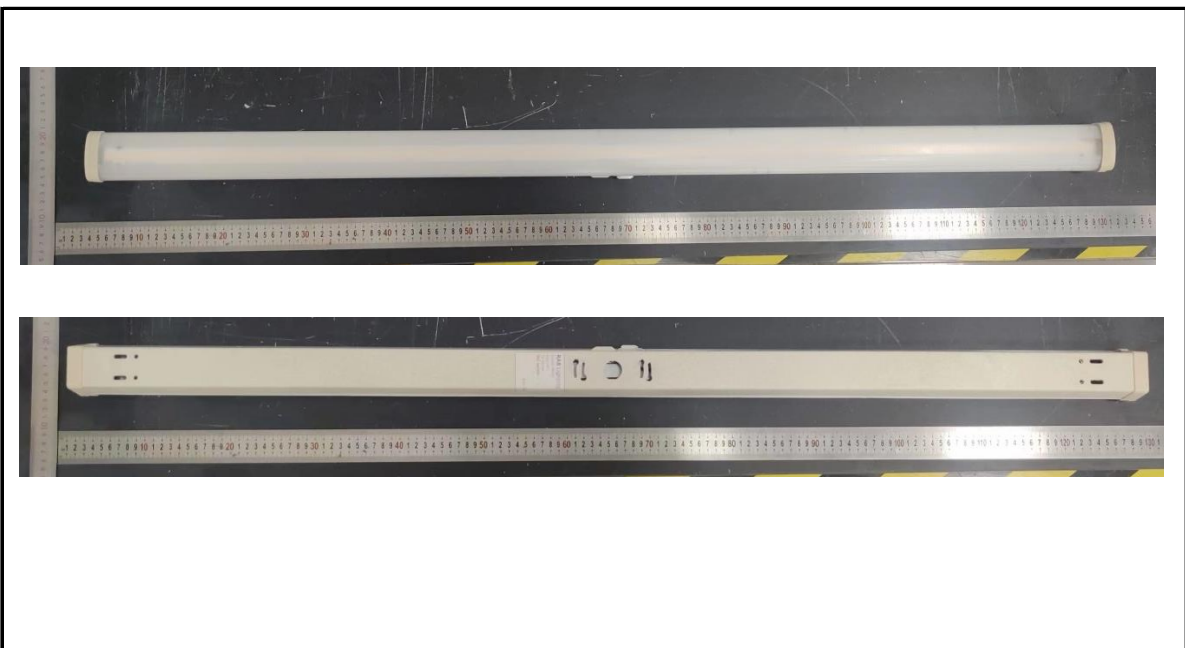
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3.0 Production Description

Luminaire Description: CS4 @75% Power /4000K

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 @75% Power /4000K	Sample ID.	W1
Opreate 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 paramters 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 ± 0.2 percent under load.

The sample was measured using 4π 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

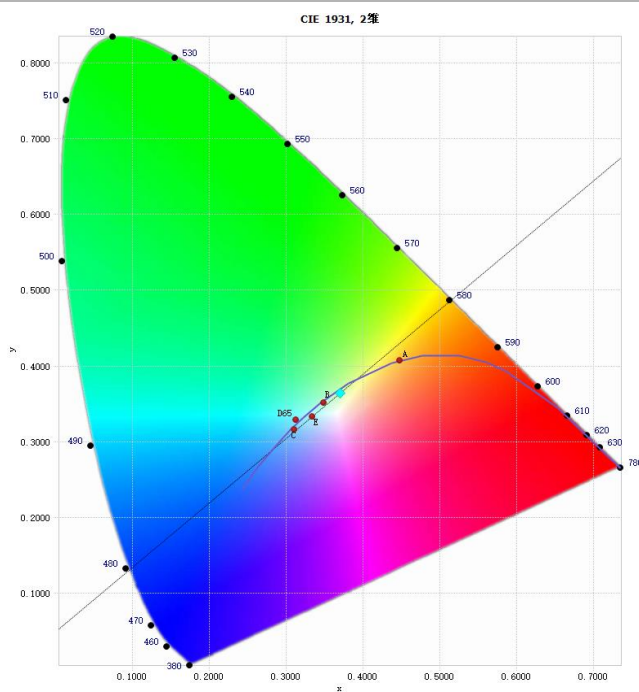
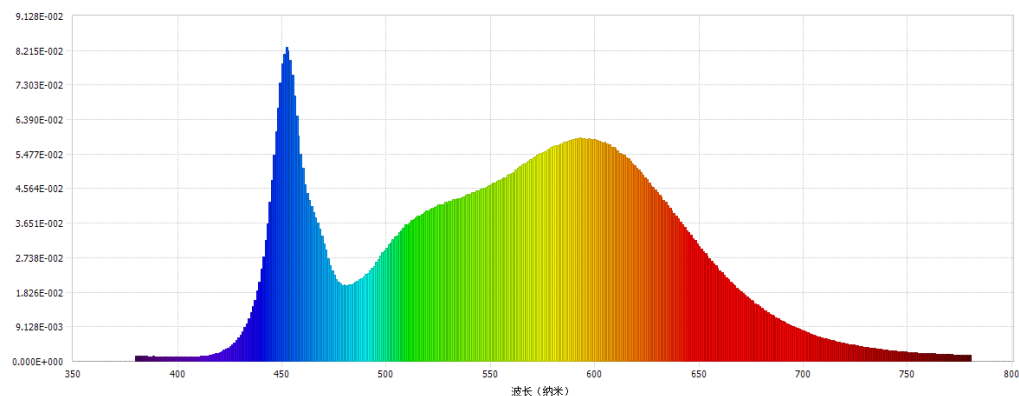
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.01	60	0.217	25.9	0.996
277.02	60	0.098	26.0	0.959

Test Result

CCT (K)	CRI	R9	Duv
4204	85	19	-0.0027

Rf	Rg	IES Rcs,h1
85	96	-11%

4.1 Integrating Sphere Test



4.1 Integrating Sphere Test

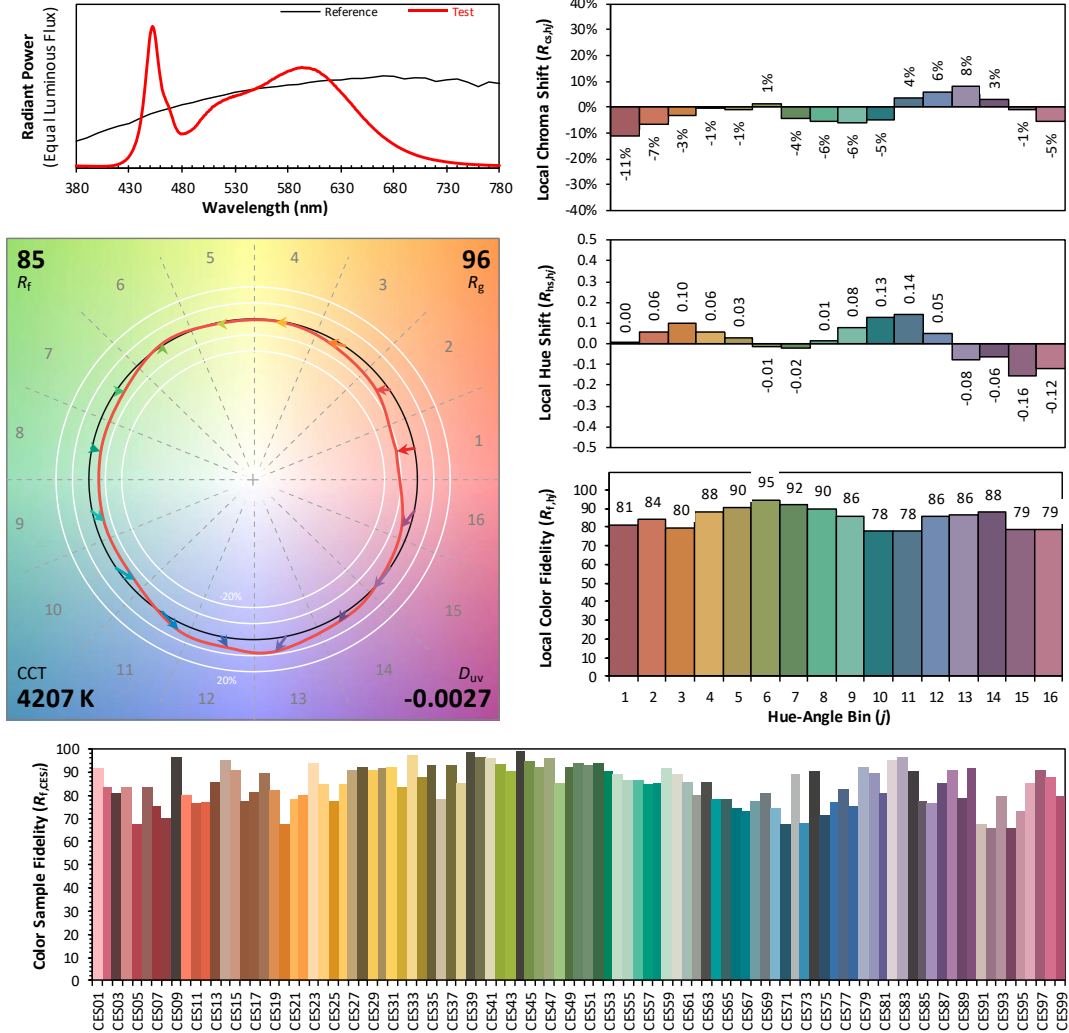
IES TM-30-18 Color Rendition Report

Source: DLF2310103-23a

Manufacturer: RAB Lighting Inc.

Date: 2023/10/23

Model: CS4 @75% Power /4000K



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

x 0.3702
 y 0.3646
 u' 0.2232
 v' 0.4946

CIE 13.3-1995
(CRI)

R_a 86
 R_g 23

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	1.42E-03	485	2.09E-02	590	5.87E-02	695	9.16E-03
385	1.28E-03	490	2.29E-02	595	5.88E-02	700	7.95E-03
390	1.24E-03	495	2.62E-02	600	5.85E-02	705	6.93E-03
395	1.17E-03	500	3.00E-02	605	5.79E-02	710	6.07E-03
400	1.10E-03	505	3.32E-02	610	5.62E-02	715	5.30E-03
405	1.11E-03	510	3.62E-02	615	5.39E-02	720	4.69E-03
410	1.23E-03	515	3.84E-02	620	5.11E-02	725	4.17E-03
415	1.55E-03	520	3.99E-02	625	4.81E-02	730	3.67E-03
420	2.34E-03	525	4.13E-02	630	4.46E-02	735	3.27E-03
425	3.99E-03	530	4.24E-02	635	4.11E-02	740	2.92E-03
430	6.95E-03	535	4.30E-02	640	3.78E-02	745	2.64E-03
435	1.29E-02	540	4.41E-02	645	3.39E-02	750	2.38E-03
440	2.43E-02	545	4.54E-02	650	3.04E-02	755	2.16E-03
445	4.78E-02	550	4.67E-02	655	2.71E-02	760	2.05E-03
450	7.85E-02	555	4.80E-02	660	2.39E-02	765	1.89E-03
455	7.56E-02	560	4.98E-02	665	2.10E-02	770	1.74E-03
460	5.11E-02	565	5.19E-02	670	1.84E-02	775	1.66E-03
465	3.92E-02	570	5.35E-02	675	1.61E-02	780	1.58E-03
470	3.11E-02	575	5.51E-02	680	1.41E-02		
475	2.27E-02	580	5.67E-02	685	1.22E-02		
480	2.02E-02	585	5.78E-02	690	1.06E-02		

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	CS4 @75% Power /4000K	Sample ID.	W1
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 ± 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° vertical intervals and 10° horizontal intervals.

Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WROST CASE	277.01	60	0.097	25.9	0.959
NON-WROST CASE	120.00	60	0.216	25.8	0.996

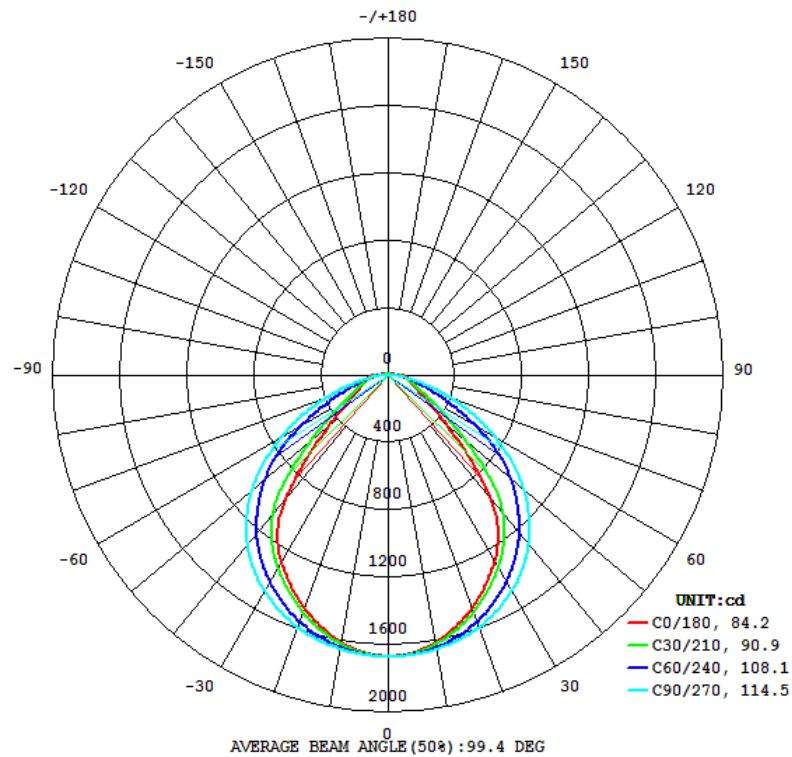
Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
4071	137.9	156.4	84.2	114.5	157.2

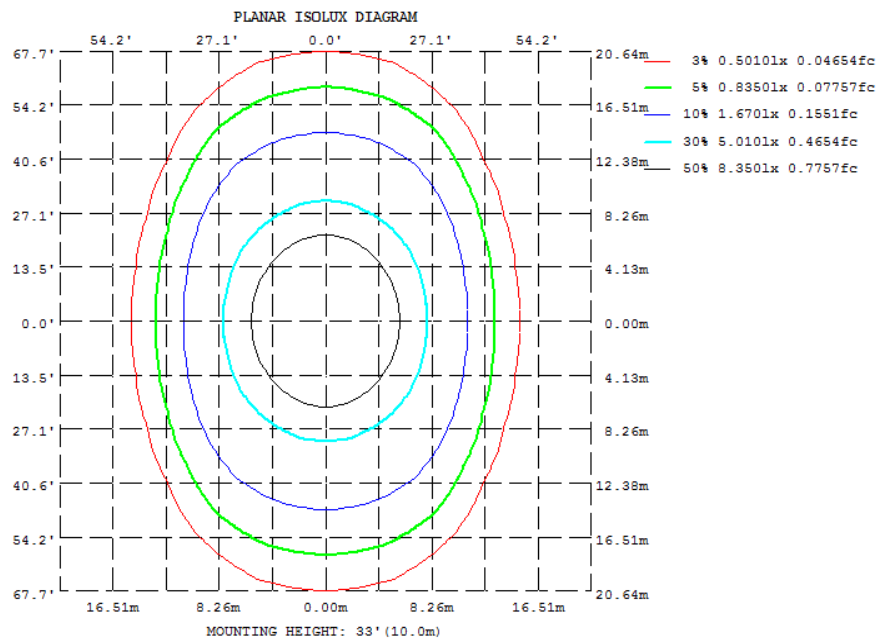
Zonal Lumen Requirement (0°-90°)	Zonal Lumen Requirement (0°-60°)	BUG rating	UGR (X=4H, Y=8H, 70/50/20%)
97.39%	82.43%	B2-U3-G1	23.8
Zonal Lumen Requirement (20°-50°)	Length(ft)	Lumen/ft	
54.17%	4	1018	

4.2 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	1612	1632	1651	1632	1612	1632	1651	1632
20	1469	1524	1590	1524	1469	1524	1590	1524
30	1277	1363	1480	1363	1277	1363	1480	1363
40	949.7	1150	1309	1150	949.7	1150	1309	1150
50	459.2	815.4	1062	815.4	459.2	815.4	1062	815.4
60	238.5	403.3	742.7	403.3	238.5	403.3	742.7	403.3
70	161.9	199.8	402.0	199.8	161.9	199.8	402.0	199.8
80	125.7	100.8	126.2	100.8	125.7	100.8	126.2	100.8
90	88.23	45.35	0.7462	45.35	88.23	45.35	0.7462	45.35
100	49.09	21.58	1.323	21.58	49.09	21.58	1.323	21.58
110	33.17	16.56	3.528	16.56	33.17	16.56	3.528	16.56
120	27.52	14.54	5.260	14.54	27.52	14.54	5.260	14.54
130	20.29	11.88	6.599	11.88	20.29	11.88	6.599	11.88
140	14.42	9.072	7.681	9.072	14.42	9.072	7.681	9.072
150	10.30	7.423	8.246	7.423	10.30	7.423	8.246	7.423
160	7.965	6.903	8.084	6.903	7.965	6.903	8.084	6.903
170	9.927	9.999	8.319	9.999	9.927	9.999	8.319	9.999
180	5.203	9.168	10.03	9.168	5.203	9.168	10.03	9.168
DEG	LUMINOUS INTENSITY:cd							

UGR Table - Corrected

UGR Table - Corrected										
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		UGR Viewed Crosswise					UGR Viewed Endwise			
		21.6	23.1	22.1	23.5	23.9	15.8	17.3	16.2	17.7
3H		22.9	24.2	23.3	24.6	25.1	17.3	18.7	17.8	19.1
4H		23.3	24.5	23.7	24.9	25.4	18.2	19.5	18.7	19.9
6H		23.4	24.6	23.9	25.0	25.5	19.3	20.4	19.7	20.8
8H		23.4	24.5	23.9	25.0	25.4	19.9	21.0	20.3	21.4
12H		23.4	24.5	23.9	24.9	25.4	20.6	21.6	21.0	22.0
4H	2H	21.6	22.9	22.1	23.3	23.7	16.6	17.9	17.1	18.3
	3H	23.1	24.1	23.6	24.6	25.1	18.3	19.3	18.7	19.8
	4H	23.5	24.5	24.0	24.9	25.4	19.2	20.1	19.7	20.6
	6H	23.8	24.6	24.3	25.1	25.6	20.4	21.2	20.9	21.7
	8H	23.8	24.6	24.3	25.1	25.6	21.0	21.8	21.6	22.3
	12H	23.8	24.5	24.3	25.0	25.6	21.8	22.5	22.4	23.0
8H	4H	23.5	24.3	24.0	24.8	25.3	19.5	20.3	20.0	20.8
	6H	23.8	24.5	24.4	25.0	25.6	20.8	21.4	21.4	22.0
	8H	23.9	24.5	24.5	25.0	25.6	21.6	22.1	22.2	22.7
	12H	23.9	24.4	24.5	25.0	25.6	22.5	23.0	23.1	23.6
12H	4H	23.5	24.2	24.0	24.7	25.3	19.6	20.3	20.1	20.8
	6H	23.8	24.4	24.4	24.9	25.5	20.9	21.4	21.5	22.0
	8H	23.9	24.4	24.5	25.0	25.6	21.7	22.2	22.2	22.7
Maximum UGR = 25.6										

4.2 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	157.59	0 - 10	157.59	3.87%
10-20	447.42	0 - 20	605.01	14.86%
20-30	670.04	0 - 30	1275.05	31.32%
30-40	792.74	0 - 40	2067.79	50.79%
40-50	742.72	0 - 50	2810.51	69.03%
50-60	545.46	0 - 60	3355.97	82.43%
60-70	341.72	0 - 70	3697.69	90.82%
70-80	185.02	0 - 80	3882.71	95.37%
80-90	82.41	0 - 90	3965.12	97.39%
90-100	35.95	0 - 100	4001.07	98.27%
100-110	20.82	0 - 110	4021.89	98.79%
110-120	16.08	0 - 120	4037.97	99.18%
120-130	12.27	0 - 130	4050.24	99.48%
130-140	8.38	0 - 140	4058.62	99.69%
140-150	5.65	0 - 150	4064.27	99.83%
150-160	3.76	0 - 160	4068.03	99.92%
160-170	2.35	0 - 170	4070.38	99.98%
170-180	0.92	0 - 180	4071.30	100.00%

4.2 Goniophotometer Test

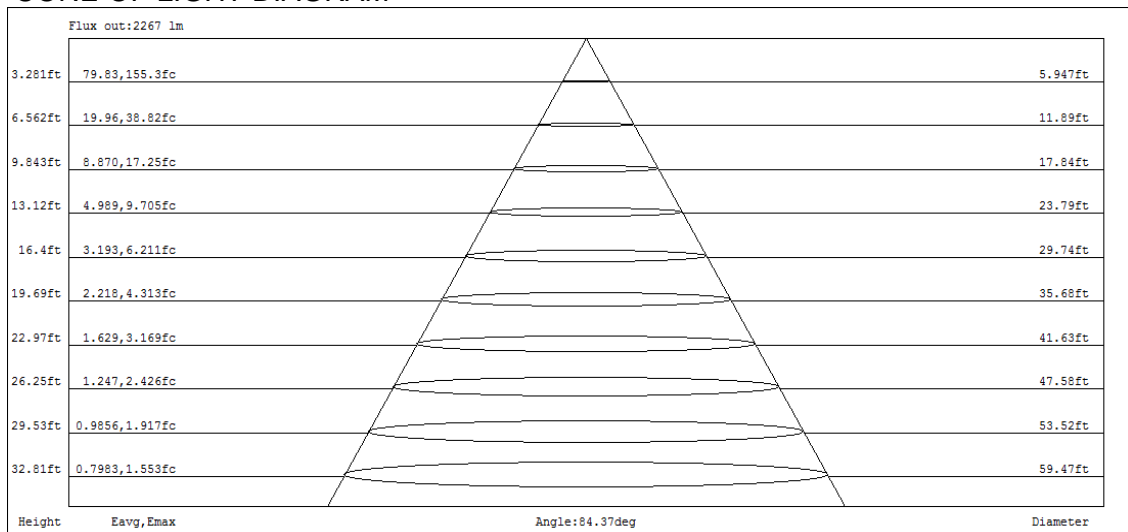
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

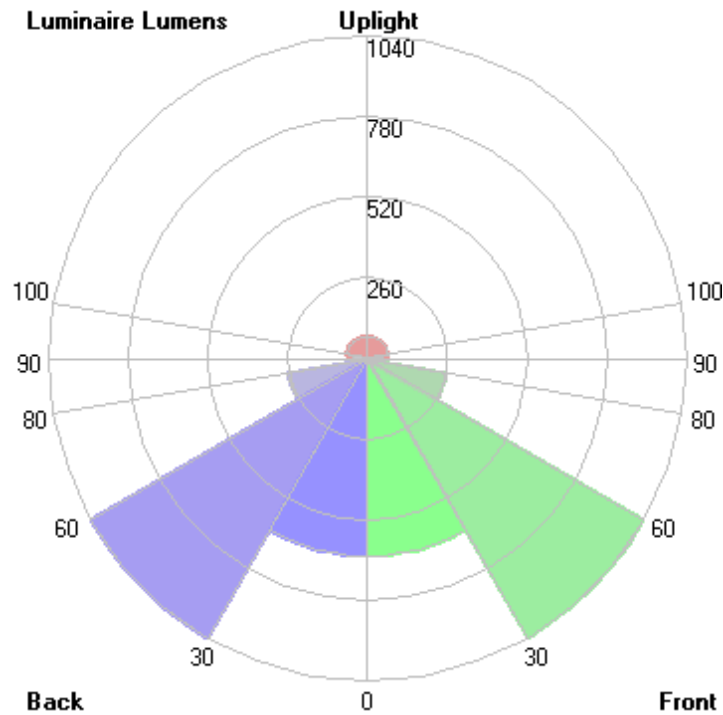
RC	80				70				50			30			10			0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	118	118	118	118	115	115	115	115	110	110	110	104	104	104	100	100	100	97
1	109	105	101	97	106	102	98	95	97	94	92	93	91	88	89	87	85	83
2	100	92	86	81	97	90	84	80	86	81	77	83	79	75	79	76	73	71
3	92	82	74	68	89	80	73	68	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	32	30
10	55	42	35	30	54	42	34	29	41	34	29	39	33	29	38	33	29	27

CONE OF LIGHT DIAGRAM



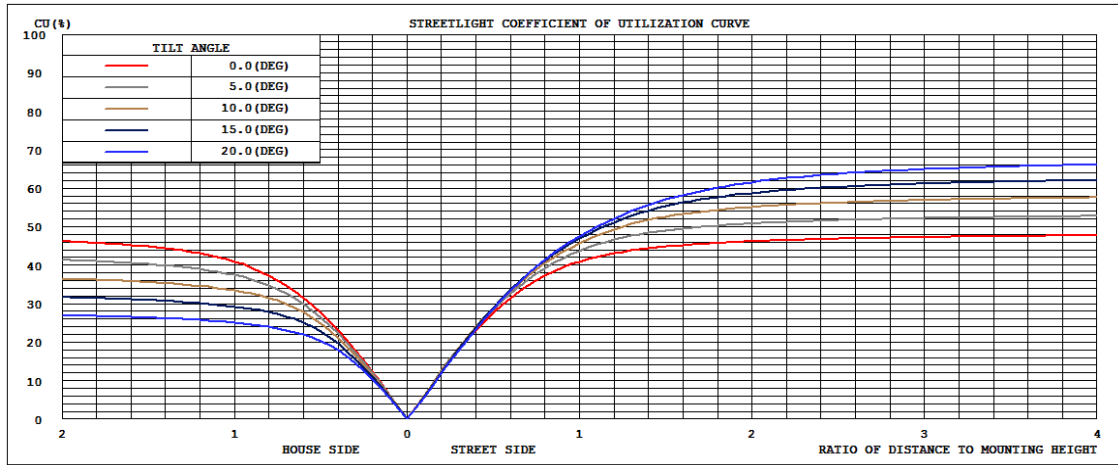
4.2 Goniophotometer Test

LCS/BUG

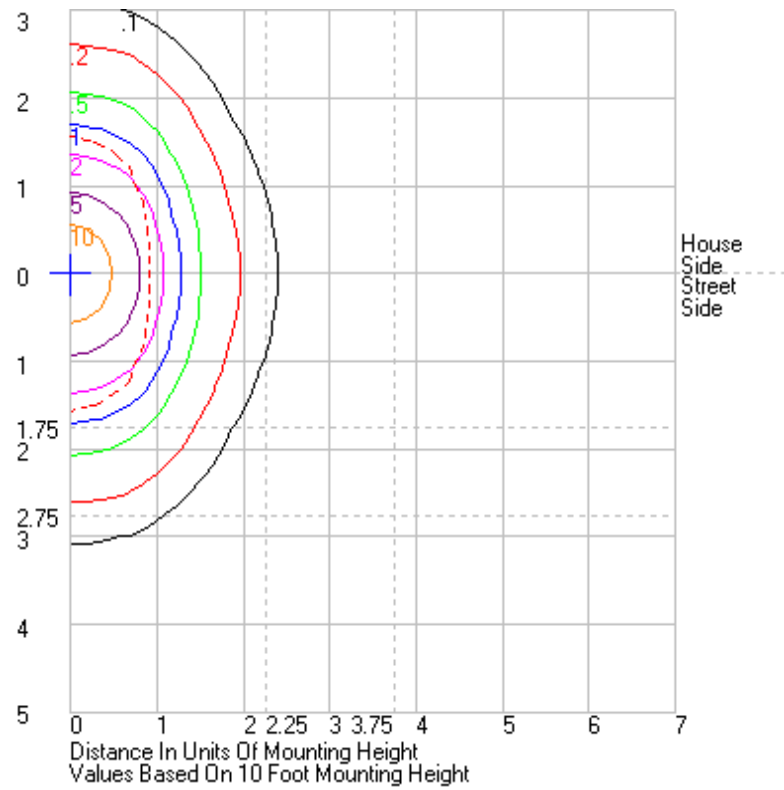


	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	637.5	N.A.	15.7
FM - Front-Medium (30-60)	1040.5	N.A.	25.6
FH - Front-High (60-80)	263.4	N.A.	6.5
FVH - Front-Very High (80-90)	41.2	N.A.	1.0
BL - Back-Low (0-30)	637.5	N.A.	15.7
BM - Back-Medium (30-60)	1040.5	N.A.	25.6
BH - Back-High (60-80)	263.4	N.A.	6.5
BVH - Back-Very High (80-90)	41.2	N.A.	1.0
UL - Uplight-Low (90-100)	36.0	N.A.	0.9
UH - Uplight-High (100-180)	70.2	N.A.	1.7
Total	4071.4	N.A.	100.0
BUG Rating	B2-U3-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	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55	1670.55
1	1670.09	1669.88	1670.14	1670.35	1669.53	1669.49	1668.15	1669.49	1669.53	1670.35	1670.14	1669.88	1670.09	1669.88	1670.14	1670.35	1669.53	1669.49	1668.15	1669.49	1669.53	1670.35	1670.14	1669.88	1670.09
2	1669.44	1669.21	1668.44	1669.1	1668.3	1667.85	1666.55	1667.85	1668.3	1669.1	1668.44	1669.21	1669.44	1669.21	1668.44	1669.1	1668.3	1667.85	1666.55	1667.85	1668.3	1669.1	1668.44	1669.21	1669.44
3	1669.66	1667.76	1667.84	1666.97	1666.3	1665.22	1664.36	1665.22	1666.3	1666.97	1667.84	1667.76	1669.66	1667.76	1667.84	1666.97	1666.3	1665.22	1664.36	1665.22	1666.3	1666.97	1667.84	1667.76	1669.66
4	1667.23	1666.36	1665.6	1663.98	1662.7	1661.14	1659.33	1661.14	1662.7	1663.98	1665.6	1666.36	1667.23	1666.36	1665.6	1663.98	1662.7	1661.14	1659.33	1661.14	1662.7	1663.98	1665.6	1666.36	1667.23
5	1665.51	1664.71	1663.16	1660.44	1658.1	1656.25	1653.87	1656.25	1658.1	1660.44	1663.16	1664.71	1665.51	1664.71	1663.16	1660.44	1658.1	1656.25	1653.87	1656.25	1658.1	1660.44	1663.16	1664.71	1665.51
6	1664.48	1662.01	1660.29	1656.42	1652.85	1650.55	1648.48	1650.55	1652.85	1656.42	1660.29	1662.01	1664.48	1662.01	1660.29	1656.42	1652.85	1650.55	1648.48	1650.55	1652.85	1656.42	1660.29	1662.01	1664.48
7	1660.81	1659.15	1655.85	1651.18	1646.28	1643.23	1640.45	1643.23	1646.28	1651.18	1655.85	1659.15	1660.81	1659.15	1655.85	1651.18	1646.28	1643.23	1640.45	1643.23	1646.28	1651.18	1655.85	1659.15	1660.81
8	1658.03	1656.08	1651.29	1645.67	1639.11	1635.41	1632.51	1635.41	1639.11	1645.67	1651.29	1656.08	1658.03	1656.08	1651.29	1645.67	1639.11	1635.41	1632.51	1635.41	1639.11	1645.67	1651.29	1656.08	1658.03
9	1655.17	1652.25	1646.87	1639.1	1631.4	1626.23	1622.83	1626.23	1631.4	1639.1	1646.87	1652.25	1655.17	1652.25	1646.87	1639.1	1631.4	1626.23	1622.83	1626.23	1631.4	1639.1	1646.87	1652.25	1655.17
10	1650.68	1648.3	1641.5	1631.67	1622.81	1616.12	1612.12	1616.12	1622.81	1631.67	1641.5	1648.3	1650.68	1648.3	1641.5	1631.67	1622.81	1616.12	1612.12	1616.12	1622.81	1631.67	1641.5	1648.3	1650.68
11	1646.68	1643.83	1634.64	1624.24	1612.65	1605.02	1601.04	1605.02	1612.65	1624.24	1634.64	1643.83	1646.68	1643.83	1634.64	1624.24	1612.65	1605.02	1601.04	1605.02	1612.65	1624.24	1634.64	1643.83	1646.68
12	1643.16	1638.5	1628.73	1615.39	1602.27	1593.27	1588.52	1593.27	1602.27	1615.39	1628.73	1638.5	1643.16	1638.5	1628.73	1615.39	1602.27	1593.27	1588.52	1593.27	1602.27	1615.39	1628.73	1638.5	1643.16
13	1636.97	1632.64	1621.35	1605.63	1591.19	1581.16	1576.66	1581.16	1591.19	1605.63	1621.35	1632.64	1636.97	1632.64	1621.35	1605.63	1591.19	1581.16	1576.66	1581.16	1591.19	1605.63	1621.35	1632.64	1636.97
14	1632.23	1627.4	1613.33	1596.03	1578.56	1567.99	1562.4	1567.99	1578.56	1596.03	1613.33	1627.4	1632.23	1627.4	1613.33	1596.03	1578.56	1567.99	1562.4	1567.99	1578.56	1596.03	1613.33	1627.4	1632.23
15	1626.16	1620.55	1605.36	1585.62	1566.35	1554.09	1548.24	1554.09	1566.35	1585.62	1605.36	1620.55	1626.16	1620.55	1605.36	1585.62	1566.35	1554.09	1548.24	1554.09	1566.35	1585.62	1605.36	1620.55	1626.16
16	1619.19	1613.64	1596.24	1574.08	1552.88	1539.23	1533.26	1539.23	1552.88	1574.08	1596.24	1613.64	1619.19	1613.64	1596.24	1574.08	1552.88	1539.23	1533.26	1539.23	1552.88	1574.08	1596.24	1613.64	1619.19
17	1612.87	1606.06	1586.74	1562.56	1539.51	1524.52	1518.49	1524.52	1539.51	1562.56	1586.74	1606.06	1612.87	1606.06	1586.74	1562.56	1539.51	1524.52	1518.49	1524.52	1539.51	1562.56	1586.74	1606.06	1612.87
18	1605.87	1597.91	1576.66	1550.4	1525.21	1509.45	1503.09	1509.45	1525.21	1550.4	1576.66	1597.91	1605.87	1597.91	1576.66	1550.4	1525.21	1509.45	1503.09	1509.45	1525.21	1550.4	1576.66	1597.91	1605.87
19	1597.47	1589.48	1565.77	1537.02	1510.58	1493.64	1486.51	1493.64	1510.58	1537.02	1565.77	1589.48	1597.47	1589.48	1565.77	1537.02	1510.58	1493.64	1486.51	1493.64	1510.58	1537.02	1565.77	1589.48	1597.47
20	1590.02	1580.67	1554.63	1523.72	1495.8	1476.66	1469.29	1476.66	1495.8	1523.72	1554.63	1580.67	1590.02	1580.67	1554.63	1523.72	1495.8	1476.66	1469.29	1476.66	1495.8	1523.72	1554.63	1580.67	1590.02
21	1581.8	1571.02	1542.91	1509.61	1480.19	1460.02	1452.5	1460.02	1480.19	1509.61	1542.91	1571.02	1581.8	1571.02	1542.91	1509.61	1480.19	1460.02	1452.5	1460.02	1480.19	1509.61	1542.91	1571.02	1581.8
22	1571.37	1560.86	1530.42	1494.64	1463.4	1442.65	1433.96	1442.65	1463.4	1494.64	1530.42	1560.86	1571.37	1560.86	1530.42	1494.64	1463.4	1442.65	1433.96	1442.65	1463.4	1494.64	1530.42	1560.86	1571.37
23	1562.88	1550.58	1517.81	1480.08	1446.35	1424.39	1414.95	1424.39	1446.35	1480.08	1517.81	1550.58	1562.88	1550.58	1517.81	1480.08	1446.35	1424.39	1414.95	1424.39	1446.35	1480.08	1517.81	1550.58	1562.88
24	1552.61	1539.4	1504.91	1464.68	1429.55	1406.46	1396.19	1406.46	1429.55	1464.68	1504.91	1539.4	1552.61	1539.4	1504.91	1464.68	1429.55	1406.46	1396.19	1406.46	1429.55	1464.68	1504.91	1539.4	1552.61
25	1541.39	1527.26	1490.58	1448.43	1411.32	1387.46	1376.54	1387.46	1411.32	1448.43	1490.58	1527.26	1541.39	1527.26	1490.58	1448.43	1411.32	1387.46	1376.54	1387.46	1411.32	1448.43	1490.58	1527.26	1541.39
26	1530.77	1515.4	1476.37	1432.61	1393.51	1368.99	1357.12	1368.99	1393.51	1432.61	1476.37	1515.4	1530.77	1515.4	1476.37	1432.61	1393.51	1368.99	1357.12	1368.99	1393.51	1432.61	1476.37	1515.4	1530.77
27	1518.35	1502.66	1461.99	1415.82	1375.77	1349.88	1336.51	1349.88	1375.77	1415.82	1461.99	1502.66	1518.35	1502.66	1461.99	1415.82	1375.77	1349.88	1336.51	1349.88	1375.77	1415.82	1461.99	1502.66	1518.35
28	1505.73	1489.38	1446.25	1398.04	1356.96	1329.18	1317.07	1329.18	1356.96	1398.04	1446.25	1489.38	1505.73	1489.38	1446.25	1398.04	1356.96	1329.18	1317.07	1329.18	1356.96	1398.04	1446.25	1489.38	1505.73
29	1493.34	1475.18	1430.74	1381.21	1337.99	1309.25	1297.65	1309.25	1337.99	1381.21	1430.74	1475.18	1493.34	1475.18	1430.74	1381.21	1337.99	1309.25	1297.65	1309.25	1337.99	1381.21	1430.74	1475.18	1493.34
30	1479.91	1460.77	1414.94	1363.18	1317.98	1288.53	1276.84	1288.53	1317.98	1363.18	1414.94	1460.77	1479.91	1460.77	1414.94	1363.18	1317.98	1288.53	1276.84	1288.53	1317.98	1363.18	1414.94	1460.77	1479.91
31	1464.64	1445.29	1397.49	1344.15	1297.85	1266.84	1255.46	1266.84	1297.85	1344.15	1397.49	1445.29	1464.64	1445.29	1397.49	1344.15	1297.85	1266.84	1255.46	1266.84	1297.85	1344.15	1397.49	1445.29	1464.64
32	1450.59	1429.78	1381	1325.74	1278.21	1245.25	1231.68	1245.25	1278.21	1325.74	1381	1429.78	1450.59	1429.78	1381	1325.74	1278.21	1245.25	1231.68	1245.25	1278.21	1325.74	1381	1429.78	1450.59
33	1435.24	1413.22	1363.91	1305.45	1255.03	1221.67	1207.38	1221.67	1255.03	1305.45	1363.91	1413.22	1435.24	1413.22	1363.91	1305.45	1255.03	1221.67	1207.38	1221.67	1255.03	1305.45	1363.91	1413.22	1435.24
34	1417.93	1396.28	1345.04	1285.22	1232.7	1198.04	1183.22	1198.04	1232.7	1285.22	1345.04	1396.28	1417.93	1396.28	1345.04	1285.22	1232.7	1198.04	1183.22	1198.04	1232.7	1285.22	1345.04	1396.28	1417.93
35	1401.57	1379.12	1326.25	1265.43	1210.37	1172.12	1154.75	1172.12	1210.37	1265.43	1326.25	1379.12	1401.57	1379.12	1326.25	1265.43	1210.37	1172.12	1154.75	1172.12	1210.37	1265.43	1326.25	1379.12	1401.57
36	1383.7	1361.55	1307.8	1243.4	1186.56	1143.21	1124.48	1143.21	1186.56	1243.4	1307.8	1361.55	1383.7	1361.55	1307.8	1243.4	1186.56	1143.21	1124.48	1143.21	1186.56	1243.4	1307.8	1361.55	1383.7
37	1365.8	1343.17	1287.47	1220.28	1161.62	1111.66	1087.66	1111.66	1161.62	1220.28	1287.47	1343.17	1365.8	1343.17	1287.47	1220.28	1161.62	1111.66	1087.66	1111.66	1161.62	1220.28	1287.47	1343.17	1365.8
38	1349.01	1323.66	1266.43	1203.81	1135.82	1075.28	1047.68	1075.28	1135.82	1203.81	1266.43	1323.66	1349.01</												

51	1031.66	1002.54	932.53	768.23	563.72	456.35	424.56	456.35	563.72	768.23	932.53	1002.54	1031.66	1002.54	932.53	768.23	563.72	456.35	424.56	456.35	563.72	768.23	932.53	1002.54	1031.66
52	1002.23	973.03	901.26	721.76	522.46	422.43	394.93	422.43	522.46	721.76	901.26	973.03	1002.23	973.03	901.26	721.76	522.46	422.43	394.93	422.43	522.46	721.76	901.26	973.03	1002.23
53	971.98	942.79	869.95	675.55	483.82	392.34	367.53	392.34	483.82	675.55	869.95	942.79	971.98	942.79	869.95	675.55	483.82	392.34	367.53	392.34	483.82	675.55	869.95	942.79	971.98
54	940.47	912.03	836.87	629.34	448.68	365.55	342.88	365.55	448.68	629.34	836.87	912.03	940.47	912.03	836.87	629.34	448.68	365.55	342.88	365.55	448.68	629.34	836.87	912.03	940.47
55	909.23	881.29	801.81	585.04	416.03	340.83	320.93	340.83	416.03	585.04	801.81	881.29	909.23	881.29	801.81	585.04	416.03	340.83	320.93	340.83	416.03	585.04	801.81	881.29	909.23
56	877.46	849.42	765.45	543.78	386.7	318.77	300.43	318.77	386.7	543.78	765.45	849.42	877.46	849.42	765.45	543.78	386.7	318.77	300.43	318.77	386.7	543.78	765.45	849.42	877.46
57	843.83	817.67	727.77	504.99	360.53	299.03	282.73	299.03	360.53	504.99	727.77	817.67	843.83	817.67	727.77	504.99	360.53	299.03	282.73	299.03	360.53	504.99	727.77	817.67	843.83
58	810.71	785.38	690.24	468.12	336.15	280.67	266.22	280.67	336.15	468.12	690.24	785.38	810.71	785.38	690.24	468.12	336.15	280.67	266.22	280.67	336.15	468.12	690.24	785.38	810.71
59	777.42	752.35	649.52	434.02	313.9	264.11	251.54	264.11	313.9	434.02	649.52	752.35	777.42	752.35	649.52	434.02	313.9	264.11	251.54	264.11	313.9	434.02	649.52	752.35	777.42
60	742.67	719.82	608.79	403.31	294.11	249.83	238.49	249.83	294.11	403.31	608.79	719.82	742.67	719.82	608.79	403.31	294.11	249.83	238.49	249.83	294.11	403.31	608.79	719.82	742.67
61	708.22	685.89	568.91	373.94	275.56	236.13	226.29	236.13	275.56	373.94	568.91	685.89	708.22	685.89	568.91	373.94	275.56	236.13	226.29	236.13	275.56	373.94	568.91	685.89	708.22
62	674.03	653.07	530.34	347.97	259.13	224.41	216.15	224.41	259.13	347.97	530.34	653.07	674.03	653.07	530.34	347.97	259.13	224.41	216.15	224.41	259.13	347.97	530.34	653.07	674.03
63	639.57	620.28	492.6	323.86	243.84	213.59	206.77	213.59	243.84	323.86	492.6	620.28	639.57	620.28	492.6	323.86	243.84	213.59	206.77	213.59	243.84	323.86	492.6	620.28	639.57
64	605.64	586.92	456.14	301.38	229.99	203.87	198.09	203.87	229.99	301.38	456.14	586.92	605.64	586.92	456.14	301.38	229.99	203.87	198.09	203.87	229.99	301.38	456.14	586.92	605.64
65	571.05	553.19	421.79	281.15	217.32	195.09	190.8	195.09	217.32	281.15	421.79	553.19	571.05	553.19	421.79	281.15	217.32	195.09	190.8	195.09	217.32	281.15	421.79	553.19	571.05
66	536.14	519.4	389.49	262.36	205.69	187.16	183.57	187.16	205.69	262.36	389.49	519.4	536.14	519.4	389.49	262.36	205.69	187.16	183.57	187.16	205.69	262.36	389.49	519.4	536.14
67	502.35	486.05	359.29	244.72	195.12	179.89	177.31	179.89	195.12	244.72	359.29	486.05	502.35	486.05	359.29	244.72	195.12	179.89	177.31	179.89	195.12	244.72	359.29	486.05	502.35
68	468.4	452.7	331.37	228.79	185.36	173.44	172.07	173.44	185.36	228.79	331.37	452.7	468.4	452.7	331.37	228.79	185.36	173.44	172.07	173.44	185.36	228.79	331.37	452.7	468.4
69	434.76	419.91	305.25	213.73	176.44	167.33	166.75	167.33	176.44	213.73	305.25	419.91	434.76	419.91	305.25	213.73	176.44	167.33	166.75	167.33	176.44	213.73	305.25	419.91	434.76
70	402.02	387.79	280.88	199.75	168.18	161.81	161.92	161.81	168.18	199.75	280.88	387.79	402.02	387.79	280.88	199.75	168.18	161.81	161.92	161.81	168.18	199.75	280.88	387.79	402.02
71	369.68	356.17	258.23	186.96	160.48	156.7	157.85	156.7	160.48	186.96	258.23	356.17	369.68	356.17	258.23	186.96	160.48	156.7	157.85	156.7	160.48	186.96	258.23	356.17	369.68
72	338.26	325.54	237.23	174.93	153.31	151.81	153.56	151.81	153.31	174.93	237.23	325.54	338.26	325.54	237.23	174.93	153.31	151.81	153.56	151.81	153.31	174.93	237.23	325.54	338.26
73	307.64	295.93	217.46	163.49	146.4	147.32	149.81	147.32	146.4	163.49	217.46	295.93	307.64	295.93	217.46	163.49	146.4	147.32	149.81	147.32	146.4	163.49	217.46	295.93	307.64
74	278.21	267.76	199.22	152.94	140.11	143.15	146.32	143.15	140.11	152.94	199.22	267.76	278.21	267.76	199.22	152.94	140.11	143.15	146.32	143.15	140.11	152.94	199.22	267.76	278.21
75	249.46	240.67	181.82	142.84	134.11	139.02	142.6	139.02	134.11	142.84	181.82	240.67	249.46	240.67	181.82	142.84	134.11	139.02	142.6	139.02	134.11	142.84	181.82	240.67	249.46
76	222.46	215.23	165.69	133.48	128.43	135.17	139.3	135.17	128.43	133.48	165.69	215.23	222.46	215.23	165.69	133.48	128.43	135.17	139.3	135.17	128.43	133.48	165.69	215.23	222.46
77	196.28	191.14	150.56	124.59	122.95	131.24	135.61	131.24	122.95	124.59	150.56	191.14	196.28	191.14	150.56	124.59	122.95	131.24	135.61	131.24	122.95	124.59	150.56	191.14	196.28
78	171.49	168.57	136.2	116.1	117.82	127.42	132.27	127.42	117.82	116.1	136.2	168.57	171.49	168.57	136.2	116.1	117.82	127.42	132.27	127.42	117.82	116.1	136.2	168.57	171.49
79	148.43	147.63	122.74	108.25	112.71	123.81	129.18	123.81	112.71	108.25	122.74	147.63	148.43	147.63	122.74	108.25	112.71	123.81	129.18	123.81	112.71	108.25	122.74	147.63	148.43
80	126.17	127.46	110.06	100.84	107.84	120.17	125.7	120.17	107.84	100.84	110.06	127.46	126.17	127.46	110.06	100.84	107.84	120.17	125.7	120.17	107.84	100.84	110.06	127.46	126.17
81	105.22	108.75	98.3	93.74	103.12	116.41	122.36	116.41	103.12	93.74	98.3	108.75	105.22	108.75	98.3	93.74	103.12	116.41	122.36	116.41	103.12	93.74	108.75	105.22	
82	85.99	91.8	87.45	87.06	98.51	112.77	118.98	112.77	98.51	87.06	87.45	91.8	85.99	91.8	87.45	87.06	98.51	112.77	118.98	112.77	98.51	87.06	87.45	91.8	85.99
83	68.58	76.27	77.44	80.67	93.97	109	115.31	109	93.97	80.67	77.44	76.27	68.58	76.27	77.44	80.67	93.97	109	115.31	109	93.97	80.67	77.44	76.27	68.58
84	52.54	62.46	68.16	74.65	89.61	105.22	111.85	105.22	89.61	74.65	68.16	62.46	52.54	62.46	68.16	74.65	89.61	105.22	111.85	105.22	89.61	74.65	68.16	62.46	52.54
85	37.73	49.79	59.62	69	85.15	101.41	108.13	101.41	85.15	69	59.62	49.79	37.73	49.79	59.62	69	85.15	101.41	108.13	101.41	85.15	69	59.62	49.79	37.73
86	25.31	38.49	51.95	63.61	80.88	97.55	104.25	97.55	80.88	63.61	51.95	38.49	25.31	38.49	51.95	63.61	80.88	97.55	104.25	97.55	80.88	63.61	51.95	38.49	25.31
87	15.53	29.15	44.9	58.58	76.7	93.59	100.53	93.59	76.7	58.58	44.9	29.15	15.53	29.15	44.9	58.58	76.7	93.59	100.53	93.59	76.7	58.58	44.9	29.15	15.53
88	9.28	21.62	38.84	53.88	72.59	89.67	96.49	89.67	72.59	53.88	38.84	21.62	9.28	21.62	38.84	53.88	72.59	89.67	96.49	89.67	72.59	53.88	38.84	21.62	9.28
89	3.08	16.11	33.57	49.44	68.54	85.62	92.31	85.62	68.54	49.44	33.57	16.11	3.08	16.11	33.57	49.44	68.54	85.62	92.31	85.62	68.54	49.44	33.57	16.11	3.08
90	0.75	12.44	29.06	45.35	64.48	81.35	88.23	81.35	64.48	45.35	29.06	12.44	0.75	12.44	29.06	45.35	64.48	81.35	88.23	81.35	64.48	45.35	29.06	12.44	0.75
91	0.13	9.33	25.36	41.6	60.66	77.21	83.7	77.21	60.66	41.6	25.36	9.33	0.13	9.33	25.36	41.6	60.66	77.21	83.7	77.21	60.66	41.6	25.36	9.33	0.13
92	0.15	7.52	22.31	38.15	56.67	72.91	79.37	72.91	56.67	38.15	22.31	7.52	0.15	7.52	22.31	38.15	56.67	72.91	79.37	72.91	56.67	38.15	22.31	7.52	0.15
93	0.22	6.41	19.9	35	52.9	68.71	75.13	68.71	52.9	35	19.9	6.41	0.22	6.41	19.9	35	52.9	68.71	75.13	68.71	52.9	35	19.9	6.41	0.22
94	0.31	5.75	17.95	32.26	49.36	64.6	70.76	64.6	49.36	32.26	17.95	5.75	0.31	5.75	17.95	32.26	49.36	64.6	70.76	64.6	49.36	32.26	17.95	5.75	0

106	2.69	4.3	10.18	17.64	26.26	34.08	37.4	34.08	26.26	17.64	10.18	4.3	2.69	4.3	10.18	17.64	26.26	34.08	37.4	34.08	26.26	17.64	10.18	4.3	2.69
107	2.9	4.26	9.97	17.31	25.61	33.03	36.21	33.03	25.61	17.31	9.97	4.26	2.9	4.26	9.97	17.31	25.61	33.03	36.21	33.03	25.61	17.31	9.97	4.26	2.9
108	3.12	4.23	9.87	17.02	25.02	32.11	35.05	32.11	25.02	17.02	9.87	4.23	3.12	4.23	9.87	17.02	25.02	32.11	35.05	32.11	25.02	17.02	9.87	4.23	3.12
109	3.33	4.19	9.8	16.78	24.5	31.3	34.03	31.3	24.5	16.78	9.8	4.19	3.33	4.19	9.8	16.78	24.5	31.3	34.03	31.3	24.5	16.78	9.8	4.19	3.33
110	3.53	4.15	9.71	16.56	24.08	30.58	33.17	30.58	24.08	16.56	9.71	4.15	3.53	4.15	9.71	16.56	24.08	30.58	33.17	30.58	24.08	16.56	9.71	4.15	3.53
111	3.72	4.12	9.59	16.36	23.73	29.97	32.39	29.97	23.73	16.36	9.59	4.12	3.72	4.12	9.59	16.36	23.73	29.97	32.39	29.97	23.73	16.36	9.59	4.12	3.72
112	3.89	4.1	9.49	16.19	23.43	29.48	31.79	29.48	23.43	16.19	9.49	4.1	3.89	4.1	9.49	16.19	23.43	29.48	31.79	29.48	23.43	16.19	9.49	4.1	3.89
113	4.06	4.08	9.38	16.03	23.19	29.09	31.34	29.09	23.19	16.03	9.38	4.08	4.06	4.08	9.38	16.03	23.19	29.09	31.34	29.09	23.19	16.03	9.38	4.08	4.06
114	4.24	4.07	9.28	15.83	22.94	28.72	30.95	28.72	22.94	15.83	9.28	4.07	4.24	4.07	9.28	15.83	22.94	28.72	30.95	28.72	22.94	15.83	9.28	4.07	4.24
115	4.42	4.06	9.18	15.58	22.65	28.32	30.6	28.32	22.65	15.58	9.18	4.06	4.42	4.06	9.18	15.58	22.65	28.32	30.6	28.32	22.65	15.58	9.18	4.06	4.42
116	4.6	4.07	9.08	15.29	22.38	27.88	30.2	27.88	22.38	15.29	9.08	4.07	4.6	4.07	9.08	15.29	22.38	27.88	30.2	27.88	22.38	15.29	9.08	4.07	4.6
117	4.77	4.08	8.99	15.09	22.1	27.38	29.63	27.38	22.1	15.09	8.99	4.08	4.77	4.08	8.99	15.09	22.1	27.38	29.63	27.38	22.1	15.09	8.99	4.08	4.77
118	4.94	4.1	8.88	14.91	21.76	26.86	28.95	26.86	21.76	14.91	8.88	4.1	4.94	4.1	8.88	14.91	21.76	26.86	28.95	26.86	21.76	14.91	8.88	4.1	4.94
119	5.11	4.13	8.77	14.73	21.42	26.32	28.26	26.32	21.42	14.73	8.77	4.13	5.11	4.13	8.77	14.73	21.42	26.32	28.26	26.32	21.42	14.73	8.77	4.13	5.11
120	5.26	4.16	8.65	14.54	21.04	25.74	27.52	25.74	21.04	14.54	8.65	4.16	5.26	4.16	8.65	14.54	21.04	25.74	27.52	25.74	21.04	14.54	8.65	4.16	5.26
121	5.42	4.2	8.51	14.36	20.63	25.15	26.8	25.15	20.63	14.36	8.51	4.2	5.42	4.2	8.51	14.36	20.63	25.15	26.8	25.15	20.63	14.36	8.51	4.2	5.42
122	5.56	4.24	8.38	14.15	20.21	24.54	26.1	24.54	20.21	14.15	8.38	4.24	5.56	4.24	8.38	14.15	20.21	24.54	26.1	24.54	20.21	14.15	8.38	4.24	5.56
123	5.7	4.29	8.25	13.93	19.74	23.89	25.39	23.89	19.74	13.93	8.25	4.29	5.7	4.29	8.25	13.93	19.74	23.89	25.39	23.89	19.74	13.93	8.25	4.29	5.7
124	5.84	4.35	8.11	13.69	19.25	23.24	24.68	23.24	19.25	13.69	8.11	4.35	5.84	4.35	8.11	13.69	19.25	23.24	24.68	23.24	19.25	13.69	8.11	4.35	5.84
125	5.97	4.4	7.98	13.42	18.75	22.59	23.97	22.59	18.75	13.42	7.98	4.4	5.97	4.4	7.98	13.42	18.75	22.59	23.97	22.59	18.75	13.42	7.98	4.4	5.97
126	6.1	4.46	7.86	13.13	18.19	21.93	23.24	21.93	18.19	13.13	7.86	4.46	6.1	4.46	7.86	13.13	18.19	21.93	23.24	21.93	18.19	13.13	7.86	4.46	6.1
127	6.23	4.52	7.72	12.83	17.58	21.28	22.49	21.28	17.58	12.83	7.72	4.52	6.23	4.52	7.72	12.83	17.58	21.28	22.49	21.28	17.58	12.83	7.72	4.52	6.23
128	6.35	4.58	7.59	12.52	17.07	20.6	21.77	20.6	17.07	12.52	7.59	4.58	6.35	4.58	7.59	12.52	17.07	20.6	21.77	20.6	17.07	12.52	7.59	4.58	6.35
129	6.47	4.64	7.46	12.2	16.58	19.92	21.02	19.92	16.58	12.2	7.46	4.64	6.47	4.64	7.46	12.2	16.58	19.92	21.02	19.92	16.58	12.2	7.46	4.64	6.47
130	6.6	4.7	7.33	11.88	16.09	19.25	20.29	19.25	16.09	11.88	7.33	4.7	6.6	4.7	7.33	11.88	16.09	19.25	20.29	19.25	16.09	11.88	7.33	4.7	6.6
131	6.72	4.78	7.2	11.57	15.61	18.61	19.59	18.61	15.61	11.57	7.2	4.78	6.72	4.78	7.2	11.57	15.61	18.61	19.59	18.61	15.61	11.57	7.2	4.78	6.72
132	6.83	4.86	7.09	11.26	15.14	17.98	18.88	17.98	15.14	11.26	7.09	4.86	6.83	4.86	7.09	11.26	15.14	17.98	18.88	17.98	15.14	11.26	7.09	4.86	6.83
133	6.93	4.95	7	10.94	14.65	17.38	18.22	17.38	14.65	10.94	7	4.95	6.93	4.95	7	10.94	14.65	17.38	18.22	17.38	14.65	10.94	7	4.95	6.93
134	7.04	5.04	6.91	10.63	14.17	16.8	17.6	16.8	14.17	10.63	6.91	5.04	7.04	5.04	6.91	10.63	14.17	16.8	17.6	16.8	14.17	10.63	6.91	5.04	7.04
135	7.14	5.14	6.83	10.34	13.71	16.25	17.01	16.25	13.71	10.34	6.83	5.14	7.14	5.14	6.83	10.34	13.71	16.25	17.01	16.25	13.71	10.34	6.83	5.14	7.14
136	7.24	5.26	6.75	10.07	13.24	15.72	16.46	15.72	13.24	10.07	6.75	5.26	7.24	5.26	6.75	10.07	13.24	15.72	16.46	15.72	13.24	10.07	6.75	5.26	7.24
137	7.34	5.39	6.69	9.81	12.83	15.19	15.91	15.19	12.83	9.81	6.69	5.39	7.34	5.39	6.69	9.81	12.83	15.19	15.91	15.19	12.83	9.81	6.69	5.39	7.34
138	7.45	5.54	6.63	9.55	12.43	14.68	15.39	14.68	12.43	9.55	6.63	5.54	7.45	5.54	6.63	9.55	12.43	14.68	15.39	14.68	12.43	9.55	6.63	5.54	7.45
139	7.57	5.7	6.59	9.3	12.03	14.16	14.9	14.16	12.03	9.3	6.59	5.7	7.57	5.7	6.59	9.3	12.03	14.16	14.9	14.16	12.03	9.3	6.59	5.7	7.57
140	7.68	5.89	6.56	9.07	11.67	13.65	14.42	13.65	11.67	9.07	6.56	5.89	7.68	5.89	6.56	9.07	11.67	13.65	14.42	13.65	11.67	9.07	6.56	5.89	7.68
141	7.78	6.08	6.53	8.84	11.32	13.19	13.95	13.19	11.32	8.84	6.53	6.08	7.78	6.08	6.53	8.84	11.32	13.19	13.95	13.19	11.32	8.84	6.53	6.08	7.78
142	7.89	6.32	6.51	8.62	10.98	12.75	13.48	12.75	10.98	8.62	6.51	6.32	7.89	6.32	6.51	8.62	10.98	12.75	13.48	12.75	10.98	8.62	6.51	6.32	7.89
143	7.97	6.64	6.49	8.42	10.65	12.32	13.04	12.32	10.65	8.42	6.49	6.64	7.97	6.64	6.49	8.42	10.65	12.32	13.04	12.32	10.65	8.42	6.49	6.64	7.97
144	8.04	7.03	6.47	8.23	10.32	11.94	12.6	11.94	10.32	8.23	6.47	7.03	8.04	7.03	6.47	8.23	10.32	11.94	12.6	11.94	10.32	8.23	6.47	7.03	8.04
145	8.1	7.43	6.45	8.07	9.99	11.57	12.18	11.57	9.99	8.07	6.45	7.43	8.1	7.43	6.45	8.07	9.99	11.57	12.18	11.57	9.99	8.07	6.45	7.43	8.1
146	8.14	7.8	6.44	7.91	9.71	11.21	11.78	11.21	9.71	7.91	6.44	7.8	8.14	7.8	6.44	7.91	9.71	11.21	11.78	11.21	9.71	7.91	6.44	7.8	8.14
147	8.17	8.13	6.44	7.77	9.46	10.87	11.4	10.87	9.46	7.77	6.44	8.13	8.17	8.13	6.44	7.77	9.46	10.87	11.4	10.87	9.46	7.77	6.44	8.13	8.17
148	8.19	8.41	6.43	7.63	9.2	10.5	11.01	10.5	9.2	7.63	6.43	8.41	8.19	8.41	6.43	7.63	9.2	10.5	11.01	10.5	9.2	7.63	6.43	8.41	8.19
149	8.22	8.68	6.43	7.52	8.95	10.16	10.65	10.16	8.95	7.52	6.43	8.68	8.22	8.68	6.43	7.52	8.95	10.16	10.65	10.16	8.95	7.52	6.43	8.68	8.22
150	8.25	8.9	6.44	7.42	8.72	9.84	10.3	9.84	8.72	7.42	6.44	8.9	8.25	8.9	6.44	7.42	8.72	9.84	10.3	9.84	8.72	7.42	6.44	8.9	8.25
151	8.27	9.09	6.49	7.33	8.5	9.54	9.97	9.54	8.5	7.33	6.49	9.09	8.27	9.09	6.49	7.33	8.5	9.54	9.97	9.54	8.5	7.33	6.49	9.09	8.27
152	8.28	9.24	6.53	7.25	8.3	9.26	9.68	9.26	8.3	7.25	6.53	9.24	8.28	9.24	6.53	7.25	8.3	9.26	9.68	9.26	8.3	7.25	6.53	9.24	8.28
153	8.29	9.34	6.58	7.15	8.12	8.99	9.39	8.99	8.12	7.15	6.58	9.34	8.29	9.34	6.58	7.15	8.12	8.99	9.39	8.99	8.12	7.15	6.58	9.34	8.29
154	8.31	9.42	6.65	7.1	7.97	8.73	9.12	8.73	7.97	7.1	6.65	9.42	8.31	9.42	6.65	7.1	7.97	8.73	9.12	8.73	7.97	7.1	6.65	9.42	8.31
155	8.31	9.48	6.77	7.04	7.84	8.51	8.87	8.51	7.84	7															



161	8.05	9.15	8.98	7.01	7.17	7.58	7.83	7.58	7.17	7.01	8.98	9.15	8.05	9.15	8.98	7.01	7.17	7.58	7.83	7.58	7.17	7.01	8.98	9.15	8.05
162	8.03	9.01	9.2	7.24	7.09	7.47	7.71	7.47	7.09	7.24	9.2	9.01	8.03	9.01	9.2	7.24	7.09	7.47	7.71	7.47	7.09	7.24	9.2	9.01	8.03
163	8.03	8.79	9.36	7.68	7.1	7.37	7.6	7.37	7.1	7.68	9.36	8.79	8.03	8.79	9.36	7.68	7.1	7.37	7.6	7.37	7.1	7.68	9.36	8.79	8.03
164	8	8.68	9.51	8.12	7.18	7.31	7.52	7.31	7.18	8.12	9.51	8.68	8	8.68	9.51	8.12	7.18	7.31	7.52	7.31	7.18	8.12	9.51	8.68	8
165	7.94	8.6	9.58	8.62	7.35	7.29	7.5	7.29	7.35	8.62	9.58	8.6	7.94	8.6	9.58	8.62	7.35	7.29	7.5	7.29	7.35	8.62	9.58	8.6	7.94
166	7.83	8.56	9.58	9.02	7.76	7.37	7.52	7.37	7.76	9.02	9.58	8.56	7.83	8.56	9.58	9.02	7.76	7.37	7.52	7.37	7.76	9.02	9.58	8.56	7.83
167	7.73	8.49	9.51	9.31	8.29	7.6	7.71	7.6	8.29	9.31	9.51	8.49	7.73	8.49	9.51	9.31	8.29	7.6	7.71	7.6	8.29	9.31	9.51	8.49	7.73
168	7.77	8.5	9.45	9.55	8.82	8.14	8.05	8.14	8.82	9.55	9.45	8.5	7.77	8.5	9.45	9.55	8.82	8.14	8.05	8.14	8.82	9.55	9.45	8.5	7.77
169	8.01	8.59	9.55	9.78	9.22	8.81	8.93	8.81	9.22	9.78	9.55	8.59	8.01	8.59	9.55	9.78	9.22	8.81	8.93	8.81	9.22	9.78	9.55	8.59	8.01
170	8.32	8.64	9.65	10	9.59	9.27	9.93	9.27	9.59	10	9.65	8.64	8.32	8.64	9.65	10	9.59	9.27	9.93	9.27	9.59	10	9.65	8.64	8.32
171	8.62	8.78	9.55	10.17	9.88	9.54	10.75	9.54	9.88	10.17	9.55	8.78	8.62	8.78	9.55	10.17	9.88	9.54	10.75	9.54	9.88	10.17	9.55	8.78	8.62
172	8.84	8.96	9.59	10.16	10.03	9.67	11.43	9.67	10.03	10.16	9.59	8.96	8.84	8.96	9.59	10.16	10.03	9.67	11.43	9.67	10.03	10.16	9.59	8.96	8.84
173	9.03	9.12	9.54	10.1	10.1	9.81	11.73	9.81	10.1	10.1	9.54	9.12	9.03	9.12	9.54	10.1	10.1	9.81	11.73	9.81	10.1	10.1	9.54	9.12	9.03
174	9.21	9.26	9.45	9.82	10.13	9.79	10.86	9.79	10.13	9.82	9.45	9.26	9.21	9.26	9.45	9.82	10.13	9.79	10.86	9.79	10.13	9.82	9.45	9.26	9.21
175	9.44	9.39	9.48	9.69	10.01	9.79	10.12	9.79	10.01	9.69	9.48	9.39	9.44	9.39	9.48	9.69	10.01	9.79	10.12	9.79	10.01	9.69	9.48	9.39	9.44
176	9.67	9.58	9.6	9.72	9.7	9.54	8.88	9.54	9.7	9.72	9.6	9.58	9.67	9.58	9.6	9.72	9.7	9.54	8.88	9.54	9.7	9.72	9.6	9.58	9.67
177	9.98	9.87	9.77	9.75	9.46	8.91	7.55	8.91	9.46	9.75	9.77	9.87	9.98	9.87	9.77	9.75	9.46	8.91	7.55	8.91	9.46	9.75	9.77	9.87	9.98
178	10.11	10.02	9.87	9.78	9.33	8.36	6.35	8.36	9.33	9.78	9.87	10.02	10.11	10.02	9.87	9.78	9.33	8.36	6.35	8.36	9.33	9.78	9.87	10.02	10.11
179	10.07	9.98	9.73	9.45	8.96	7.55	3.67	7.55	8.96	9.45	9.73	9.98	10.07	9.98	9.73	9.45	8.96	7.55	3.67	7.55	8.96	9.45	9.73	9.98	10.07
180	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03	10.03

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	CS4 @75% Power /4000K	Sample ID.	W1
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
120.01	60	0.217	25.9	0.996	5.22%
277.02	60	0.098	26.0	0.959	7.45%

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*****