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www.lightlaboratory.com

Report No: L091800301



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Issue Date: 9/10/2018

Report Prepared For: Horticulture Lighting Group
752 North State St, #208, Westerville, OH 43082

Model Number: HLG Elite

Test: Photosynthetically active radiation (PAR) & Electrical measurement

Standards Used: Appropriate part or all test guidelines were used for test performed:

IESNA LM79: 2008 Approved Methods for Electrical and Photometric Measurements of Solid-State Lighting Products

ANSI NEMA ANSLG C78.377: 2008 Specification of the Chromaticity of Solid State Lighting Products

ANSI C82.77:2002: Harmonic Emission Limits-Related Quality Requirements for Lighting Equipment

Description of Sample: Client submitted the sample. Received in working and undamaged condition. No modifications were necessary.

Special Test Condition: Fixture is tested with no special conditions.

Sample Arrival Date: 9/6/18

Date of Tests: 9/6/18 - 9/10/18

Seasoning of Sample: No seasoning was performed in accordance with IESNA LM-79.

Equipment List

Equipment Used	Model No	Stock No	Calibration Due Date
Chroma Programmable AC Source	61604	PS-AC02	--
Yokogawa Digital Power Meter	WT210	MT-EL06-S4	1/9/19
BK PRECISION	1747	PS-DC04	1/10/19
Fluke Digital Thermometer	52K/J	MT-TP05	1/10/19
LLI Type C Goniophotometer System	RMG-C-MKII	CD-LL04-GC	--
LLI 2M Sphere	2MR97	CD-SN03-S2	--
LLI Spectroradiometer	SPR-3000	MT-SC01-S2	Before Use

General Information

Manufacturer:	Horticulture Lighting Group
Model Number:	HLG Elite
Driver Model Number:	INVENTRONICS EUD-320S320DT

Photometric, PPF & Electrical Test Results

Total PPF (μmol/s):	753.42	* Measured range: 380nm - 780nm
Total Radiant Flux(W):	160.93	* Measured range: 380nm - 780nm
Total Lumens:	50105.39	* Measured range: 380nm - 780nm
PPF Efficacy (μmol/Joule):	2.04	
Efficacy:	135.47	
Input Voltage (VAC/60Hz):	220.01	
Input Current (Amp):	1.6954	
Input Power (W):	369.85	
Input Power Factor:	0.9914	
Current ATHD (%):	3.0%	

Test Condition

Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:45
Total Operating Time (Hours):	1:05

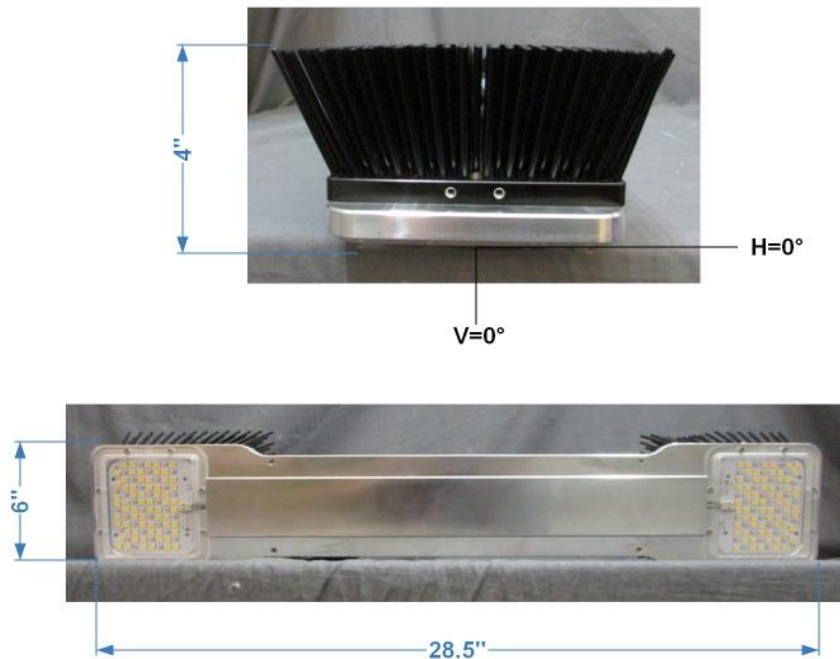
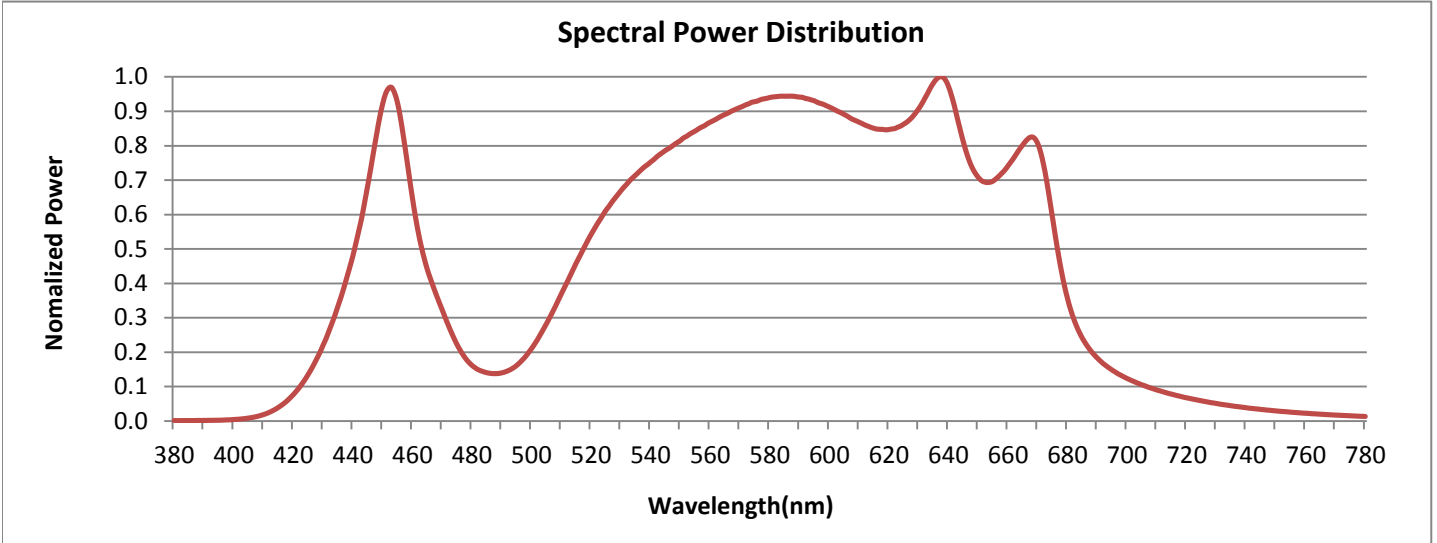


FIG. 1 LUMINAIRE

Colorimetry Test Results

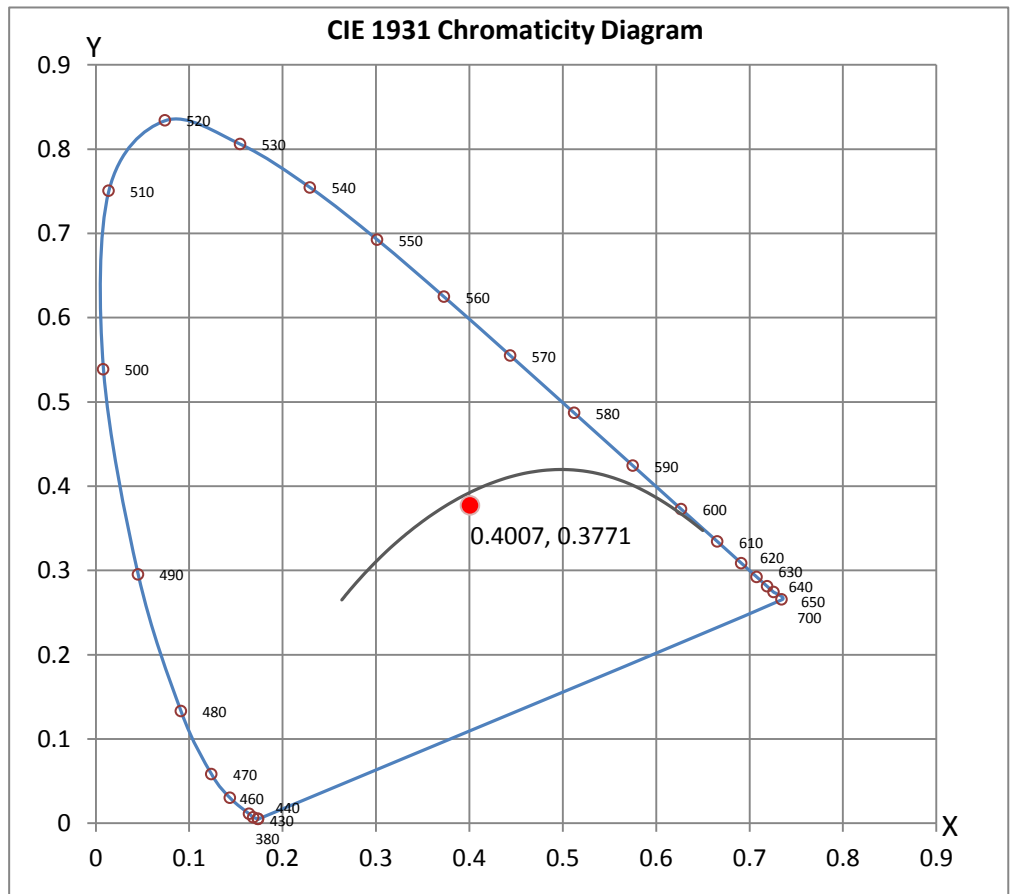


CRI & CCT

x	0.4007
y	0.3771
u'	0.2384
v'	0.5048
CRI	81.90
CCT	3489
Duv	-0.00509

R Values

R1	81.82
R2	85.93
R3	85.23
R4	80.08
R5	79.15
R6	77.04
R7	88.67
R8	77.31
R9	43.55
R10	63.51
R11	74.80
R12	53.29
R13	82.05
R14	90.63
R15	82.79



Temperature Test

Per client's request, a thermocouple is placed on the back of the LED board (FIG. 2). Thermocouple temperature is measured after the fixture is stabilized.

Thermocouple Temperature (°C): 58.2

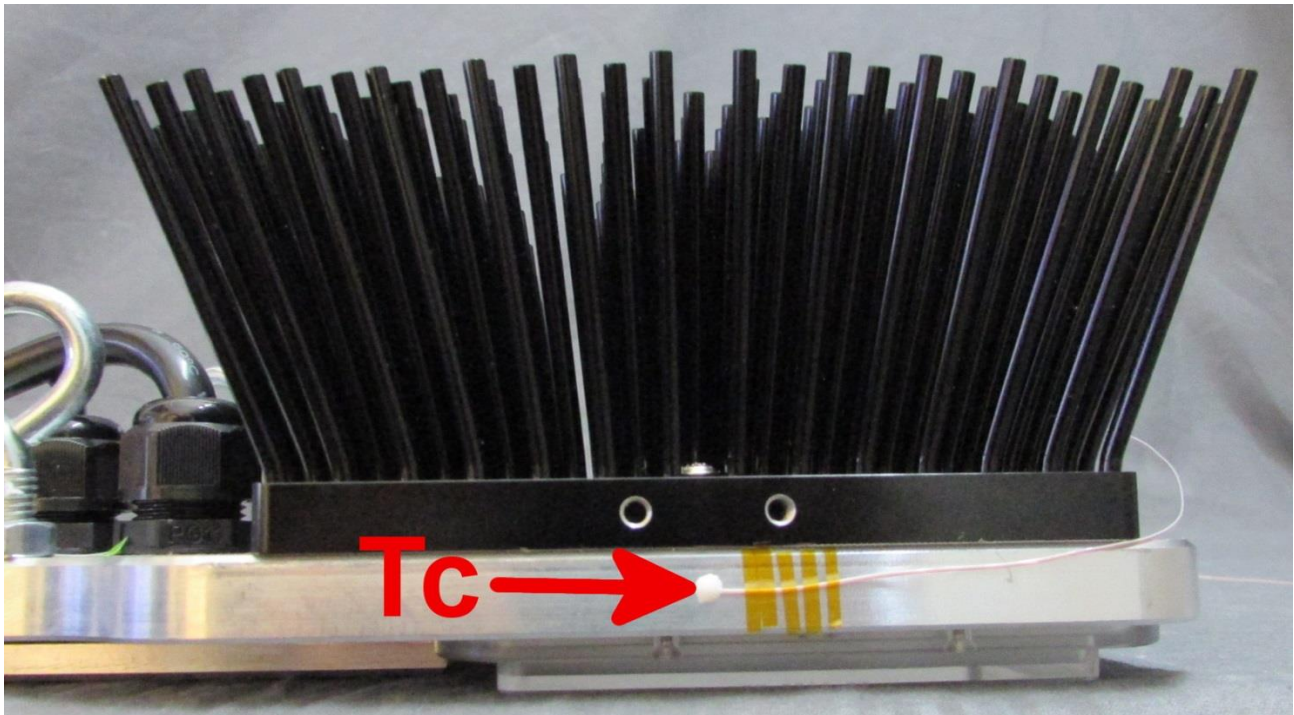


FIG. 2 Thermocouple location

Test Methods

Spectral Measurements - Integrating Sphere

A Sensing Spectroradiometer SPR-3000, in conjunction with Light Laboratory 2 meter integrating sphere was used to measure chromaticity coordinates, correlated color temperature(CCT) and the color rendering index(CRI) for each sample.

Ambient temperature is set to 25°C and is measured from the center of the fixture, within 1ft from the outside of the fixture. Temperature is maintained at 25°C throughout the testing process and the sample is stabilized for at least 30mins and longer as necessary for the sample to achieve stabilization.

Electrical measurements are measured using the listed equipment.

Disclaimers:

This report must not be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST or any agency of Federal Government.

Report Prepared by : Keyur Patel

Test Report Released by:



Jeff Ahn
Engineering Manager

Test Report Reviewed by:



Steve Kang
Quality Assurance

*Attached are photometric data reports. Total number of pages: 10



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Photometric Test Report

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L091800301.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L091800301
[TESTLAB] LIGHT LABORATORY, INC. (www.lightlaboratory.com)
[ISSUEDATE] 9/10/2018
[MANUFAC] Horticulture Lighting Group
[LUMCAT] HLG Elite
[LUMINAIRE] LED LUMINAIRE
[BALLASTCAT] INVENTRONICS EUD-320S320DT
[OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND
[MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.
[INPUT] 220.01VAC, 369.85W
[TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	50105
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	135
Total Luminaire Watts	369.85
Ballast Factor	1.00
CIE Type	Direct
Spacing Criterion (0-180)	1.34
Spacing Criterion (90-270)	1.30
Spacing Criterion (Diagonal)	1.44
Basic Luminous Shape	Rectangular
Luminous Length (0-180)	0.33 ft
Luminous Width (90-270)	2.23 ft
Luminous Height	0.00 ft

LUMINANCE DATA (cd/sq.m)

Angle In Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	257397	256922	253119
55	243232	243512	237627
65	211754	209818	213137
75	148549	138612	141717
85	80983	76289	70756

**IES INDOOR REPORT
PHOTOMETRIC FILENAME : L091800301.IES**

CANDELA TABULATION

	<u>0</u>	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>30</u>	<u>35</u>	<u>40</u>	<u>45</u>
0	17333	17333	17333	17333	17333	17333	17333	17333	17333	17333
5	17627	17585	17506	17428	17415	17391	17391	17421	17429	17422
10	17521	17460	17384	17297	17284	17271	17279	17292	17294	17294
15	17218	17159	17074	16991	16975	16960	16972	16988	16984	16969
20	16781	16724	16632	16561	16544	16533	16537	16560	16549	16544
25	16243	16176	16098	16003	15998	16000	15983	16005	15980	15975
30	15570	15504	15441	15338	15333	15338	15323	15330	15333	15290
35	14775	14700	14618	14537	14520	14532	14519	14539	14528	14492
40	13764	13689	13619	13551	13539	13544	13567	13576	13578	13556
45	12455	12410	12349	12310	12294	12332	12378	12426	12443	12432
50	10986	10966	10888	10856	10847	10897	10957	11035	11097	11098
55	9547	9520	9446	9390	9374	9366	9409	9468	9544	9558
60	8067	8037	7996	7937	7897	7835	7817	7822	7844	7853
65	6124	6094	6093	6087	6098	6071	6027	6009	6020	6068
70	4399	4410	4368	4325	4261	4222	4237	4260	4247	4195
75	2631	2623	2587	2556	2551	2547	2535	2508	2446	2455
80	1140	1148	1141	1128	1145	1142	1140	1148	1142	1099
85	483	484	483	484	485	484	480	473	464	455
90	0	0	0	0	0	0	0	0	0	0

Vert. Horizontal Angles

	<u>50</u>	<u>55</u>	<u>60</u>	<u>65</u>	<u>70</u>	<u>75</u>	<u>80</u>	<u>85</u>	<u>90</u>
0	17333	17333	17333	17333	17333	17333	17333	17333	17333
5	17375	17272	17231	17248	17213	17174	17143	17140	17142
10	17207	17130	17088	17078	17052	17058	17023	17013	17011
15	16910	16821	16783	16787	16771	16778	16730	16714	16725
20	16461	16401	16333	16356	16366	16342	16319	16312	16317
25	15913	15829	15805	15817	15823	15828	15776	15774	15789
30	15245	15181	15142	15169	15188	15194	15158	15126	15137
35	14455	14386	14358	14375	14399	14393	14374	14339	14328
40	13532	13474	13429	13467	13492	13513	13492	13436	13420
45	12411	12374	12340	12351	12361	12370	12335	12274	12248
50	11095	11062	11040	11041	11048	11032	10968	10867	10821
55	9522	9483	9489	9524	9569	9529	9457	9392	9327
60	7827	7782	7762	7781	7845	7857	7821	7809	7774
65	6085	6069	6072	6085	6142	6178	6185	6186	6164
70	4178	4235	4314	4332	4303	4277	4265	4270	4263
75	2508	2508	2474	2464	2495	2508	2490	2495	2510
80	1101	1081	1075	1053	1027	1024	1025	1035	1027
85	446	439	433	429	425	422	422	422	422
90	0	0	0	0	0	0	0	0	0

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L091800301.IES

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	6425.91	N.A.	12.80
0-30	13775.06	N.A.	27.50
0-40	22830.8	N.A.	45.60
0-60	40796.72	N.A.	81.40
0-80	49559.45	N.A.	98.90
0-90	50105.39	N.A.	100.00
10-90	48454.81	N.A.	96.70
20-40	16404.89	N.A.	32.70
20-50	25917.88	N.A.	51.70
40-70	23984.86	N.A.	47.90
60-80	8762.73	N.A.	17.50
70-80	2743.79	N.A.	5.50
80-90	545.94	N.A.	1.10
90-110	0.00	N.A.	0.00
90-120	0.00	N.A.	0.00
90-130	0.00	N.A.	0.00
90-150	0.00	N.A.	0.00
90-180	0.00	N.A.	0.00
110-180	0.00	N.A.	0.00
0-180	50105.39	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

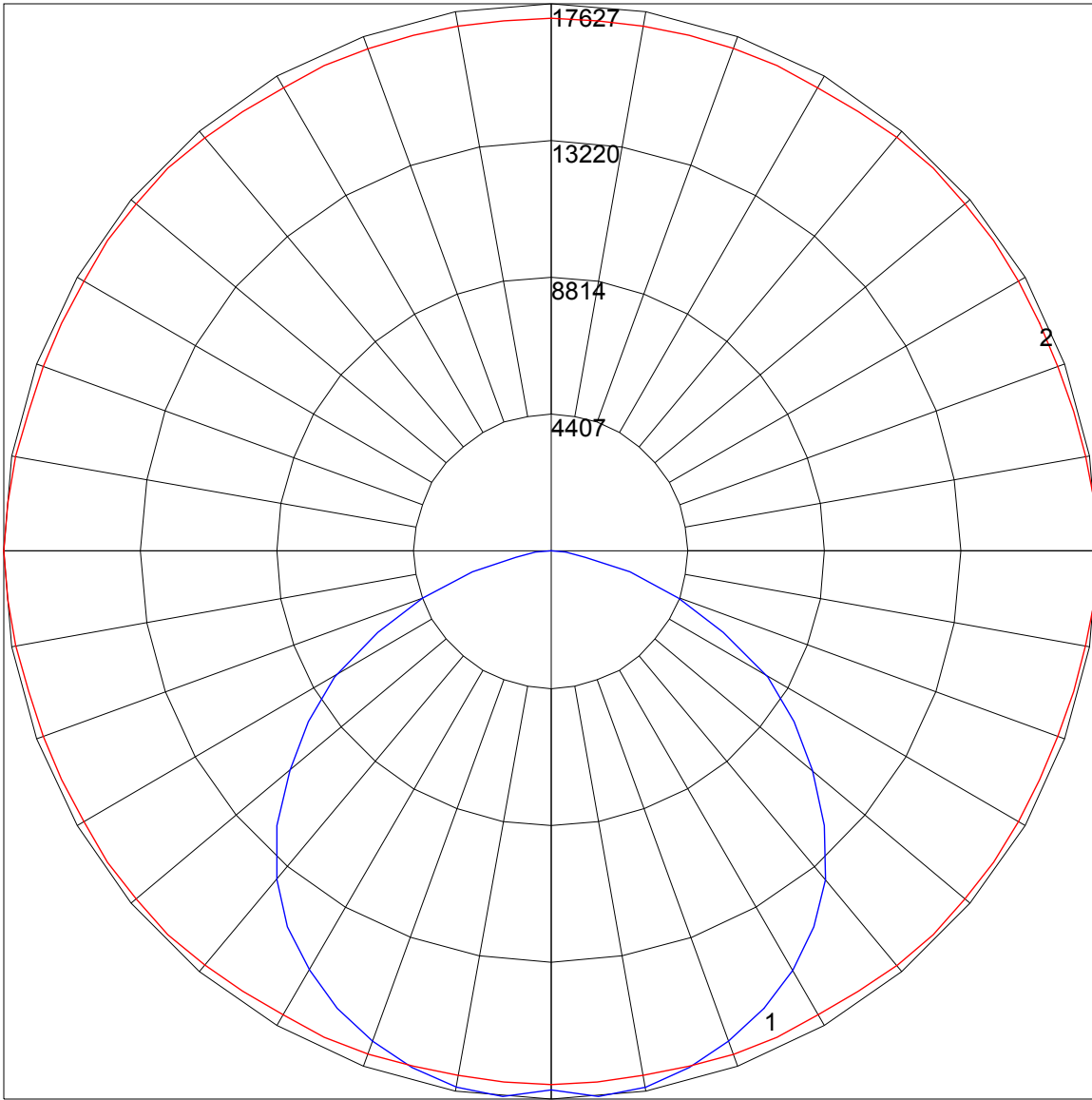
Zone	Lumens
0-10	1650.58
10-20	4775.34
20-30	7349.15
30-40	9055.74
40-50	9512.99
50-60	8452.93
60-70	6018.94
70-80	2743.79
80-90	545.94
90-100	0.00
100-110	0.00
110-120	0.00
120-130	0.00
130-140	0.00
140-150	0.00
150-160	0.00
160-170	0.00
170-180	0.00

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	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	109	105	101	97	107	102	99	95	98	95	92	94	92	90	91	89	87	85
2	100	91	85	79	97	90	84	78	86	81	77	83	79	75	80	76	73	71
3	91	80	72	66	88	79	71	65	76	69	64	73	68	63	71	66	62	60
4	83	71	63	56	81	70	62	56	67	60	55	65	59	54	63	58	53	51
5	76	64	55	48	74	62	54	48	60	53	47	58	52	47	57	51	46	44
6	70	57	48	42	69	56	48	42	54	47	41	53	46	41	51	45	41	39
7	65	52	43	37	64	51	43	37	49	42	37	48	41	36	47	41	36	34
8	61	47	39	33	59	47	38	33	45	38	33	44	37	32	43	37	32	30
9	57	43	35	30	55	43	35	29	42	34	29	40	34	29	39	33	29	27
10	53	40	32	27	52	39	32	27	38	31	27	37	31	26	37	31	26	25

POLAR GRAPH



Maximum Candela = 17627 Located At Horizontal Angle = 0, Vertical Angle = 5
1 - Vertical Plane Through Horizontal Angles (0 - 180) (Through Max. Cd.)
2 - Horizontal Cone Through Vertical Angle (5) (Through Max. Cd.)