LIGHT LABORATORY INC.
8165 E Kaiser Blvd. Anaheim, CA 92808
www.lightlaboratory.com

NVLAP TESTING
NVLAP LAB CODE 200927-0

Report No: L101705402 **Issue Date: 10/25/2017**

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

Model Number: HLG 550

Test: Photometric/Electrical Test

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.

Testing Condition: Fixture is tested with no special conditions.

Sample Arrival Date: 10/20/17

Date of Tests: 10/23/17 - 10/25/17

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-S1	11/28/17
ITECH	IT6122	PS-DC03-S1	11/28/17
Fluke Digital Thermometer	52k/J	MT-TP02-GC	11/28/17
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

*All Results in accordance to IESNA LM-79-2008: Approved Method for the Electrical and Photometric Testing of Solid-State Lighting.

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Test Summary	
Manufacturer:	Horticulture Lighting Group
Model Number:	HLG 550
Driver Model Number:	MEAN WELL HLG-480H-C2100A
Total Lumens:	77963.72
Input Voltage (VAC/60Hz):	240.00
Input Current (Amp):	2.16
Input Power (W):	507.30
Input Power Factor:	0.98
Current ATHD @ 240V(%):	6%
Current ATHD @ 277V(%):	N/A
Efficacy:	154
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:30
Total Operating Time (Hours):	1:50

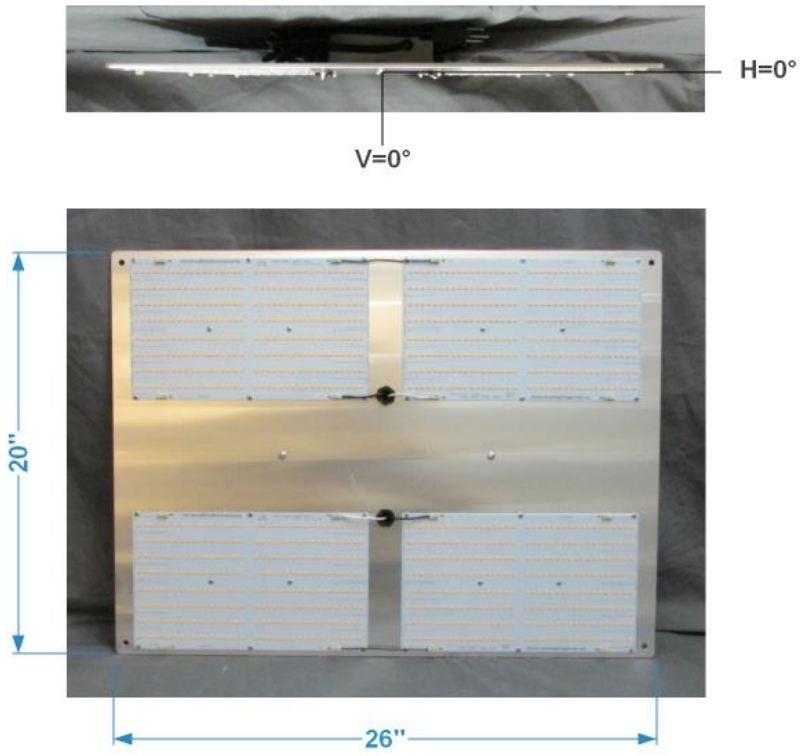

FIG. 1 LUMINAIRE

*All Results in accordance to IESNA LM-79-2008: Approved Method for the Electrical and Photometric Testing of Solid-State Lighting.

Tempearture test

Per client's request, a thermocouple is place on the back of the LED board (FIG. 2). Thermocouple temperature is measured after the fixture is 30 minutes stabilized.

Thermocouple Temperature (°C): 61.3

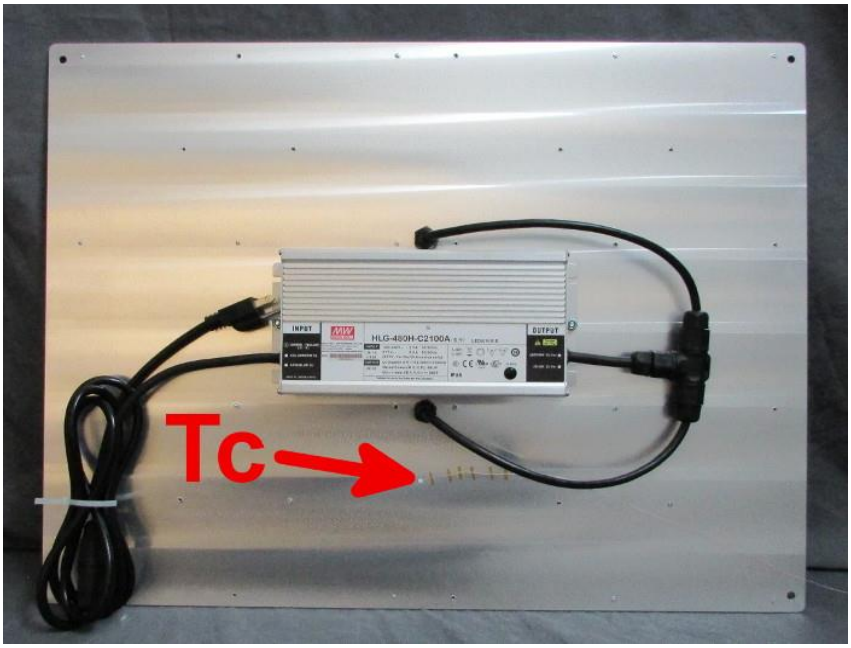

FIG. 2 Thermocouple location

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Test Methods

Photometric Measurements - Goniophotometer

A Custom Light Laboratory Type C Rotating Mirror Goniophotometer was used to measure candelas(intensity) at each angle of distribution as defined by IESNA for the appropriate fixture type.

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.

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 : Joseph Shin

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: 9*

*All Results in accordance to IESNA LM-79-2008: Approved Method for the Electrical and Photometric Testing of Solid-State Lighting.

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Photometric Test Report

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L101705402.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L101705402
[TESTLAB] LIGHT LABORATORY, INC. (www.lightlaboratory.com)
[ISSUEDATE] 10/25/2017
[MANUFAC] Horticulture Lighting Group
[LUMCAT] HLG 550
[LUMINAIRE] HLG 550 LED Lamp
[BALLASTCAT] MEAN WELL HLG-480H-C2100A
[OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND
[MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.
[INPUT] 240VAC, 507.3W
[TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	77964
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	154
Total Luminaire Watts	507.3
Ballast Factor	1.00
CIE Type	Direct
Spacing Criterion (0-180)	1.28
Spacing Criterion (90-270)	1.28
Spacing Criterion (Diagonal)	1.40
Basic Luminous Shape	Rectangular
Luminous Length (0-180)	2.00 ft
Luminous Width (90-270)	1.58 ft
Luminous Height	0.00 ft

LUMINANCE DATA (cd/sq.m)

Angle In Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	88034	87794	87722
55	85336	85236	84909
65	81869	81563	81209
75	68886	68596	68110
85	38851	39359	40725

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L101705402.IES

CANDELA TABULATION

	0	5	10	15	20	25	30	35	40	45
0	26607	26607	26607	26607	26607	26607	26607	26607	26607	26607
5	26497	26499	26491	26484	26489	26485	26445	26452	26458	26449
10	26182	26169	26157	26151	26157	26154	26141	26132	26126	26117
15	25624	25619	25618	25618	25617	25615	25601	25603	25604	25597
20	24890	24883	24860	24840	24828	24821	24818	24816	24811	24815
25	23962	23934	23932	23933	23933	23930	23924	23907	23899	23883
30	22821	22817	22816	22815	22811	22799	22801	22788	22772	22756
35	21448	21450	21444	21442	21430	21430	21417	21412	21404	21398
40	19976	19962	19954	19945	19938	19937	19928	19922	19915	19912
45	18292	18284	18279	18272	18271	18267	18258	18244	18248	18242
50	16423	16415	16417	16411	16406	16402	16396	16392	16390	16386
55	14383	14386	14380	14372	14371	14369	14365	14368	14365	14366
60	12489	12484	12478	12477	12478	12474	12469	12472	12465	12462
65	10167	10164	10160	10160	10159	10156	10154	10149	10139	10129
70	7711	7707	7713	7714	7712	7708	7700	7694	7688	7680
75	5239	5232	5233	5234	5228	5220	5216	5217	5221	5217
80	2883	2880	2883	2880	2878	2882	2883	2873	2859	2840
85	995	991	994	1000	994	991	993	999	1002	1008
90	0	0	0	0	0	0	0	0	0	0

Vert. Angles	**Horizontal Angles**								
	50	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**
0	26607	26607	26607	26607	26607	26607	26607	26607	26607
5	26460	26467	26473	26497	26490	26498	26494	26494	26502
10	26116	26125	26129	26148	26157	26150	26173	26154	26225
15	25595	25584	25579	25602	25593	25621	25615	25615	25610
20	24810	24809	24826	24854	24856	24859	24858	24849	24864
25	23875	23868	23874	23901	23901	23908	23905	23911	23907
30	22751	22749	22751	22753	22776	22769	22775	22766	22802
35	21385	21386	21386	21391	21384	21388	21376	21370	21380
40	19904	19898	19902	19897	19897	19883	19888	19891	19893
45	18232	18236	18232	18233	18213	18222	18208	18221	18227
50	16385	16379	16373	16372	16363	16356	16346	16349	16345
55	14363	14354	14344	14341	14325	14320	14318	14312	14311
60	12455	12449	12439	12429	12415	12413	12394	12397	12395
65	10126	10120	10115	10111	10106	10094	10093	10088	10085
70	7675	7669	7670	7677	7667	7663	7660	7656	7656
75	5211	5209	5196	5173	5152	5147	5161	5176	5180
80	2832	2834	2840	2838	2832	2834	2842	2850	2854
85	1010	1015	1019	1025	1027	1033	1038	1039	1043
90	0	0	0	0	0	0	0	0	0

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L101705402.IES

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	9744.62	N.A.	12.50
0-30	20765.98	N.A.	26.60
0-40	34167.4	N.A.	43.80
0-60	61110.08	N.A.	78.40
0-80	76635.86	N.A.	98.30
0-90	77963.72	N.A.	100.00
10-90	75446.46	N.A.	96.80
20-40	24422.79	N.A.	31.30
20-50	38486.46	N.A.	49.40
40-70	36943.02	N.A.	47.40
60-80	15525.78	N.A.	19.90
70-80	5525.44	N.A.	7.10
80-90	1327.86	N.A.	1.70
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	77963.72	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	2517.26
10-20	7227.36
20-30	11021.36
30-40	13401.42
40-50	14063.68
50-60	12879.00
60-70	10000.35
70-80	5525.44
80-90	1327.86
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

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L101705402.IES

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	104	100	96	106	102	98	94	97	94	91	93	91	88	90	88	86	84
2	99	90	83	78	96	88	82	77	85	79	75	82	77	73	79	75	72	69
3	90	79	71	64	87	78	70	64	75	68	63	72	66	61	69	64	60	58
4	82	70	61	54	80	69	60	54	66	59	53	64	57	52	62	56	52	49
5	75	62	53	47	73	61	53	46	59	52	46	57	50	45	55	49	45	43
6	70	56	47	41	68	55	47	40	53	46	40	52	45	40	50	44	39	37
7	64	51	42	36	63	50	42	36	48	41	35	47	40	35	46	39	35	33
8	60	46	38	32	58	46	37	32	44	37	32	43	36	31	42	36	31	29
9	56	42	34	29	55	42	34	28	41	33	28	40	33	28	39	33	28	26
10	52	39	31	26	51	39	31	26	38	31	26	37	30	26	36	30	25	24

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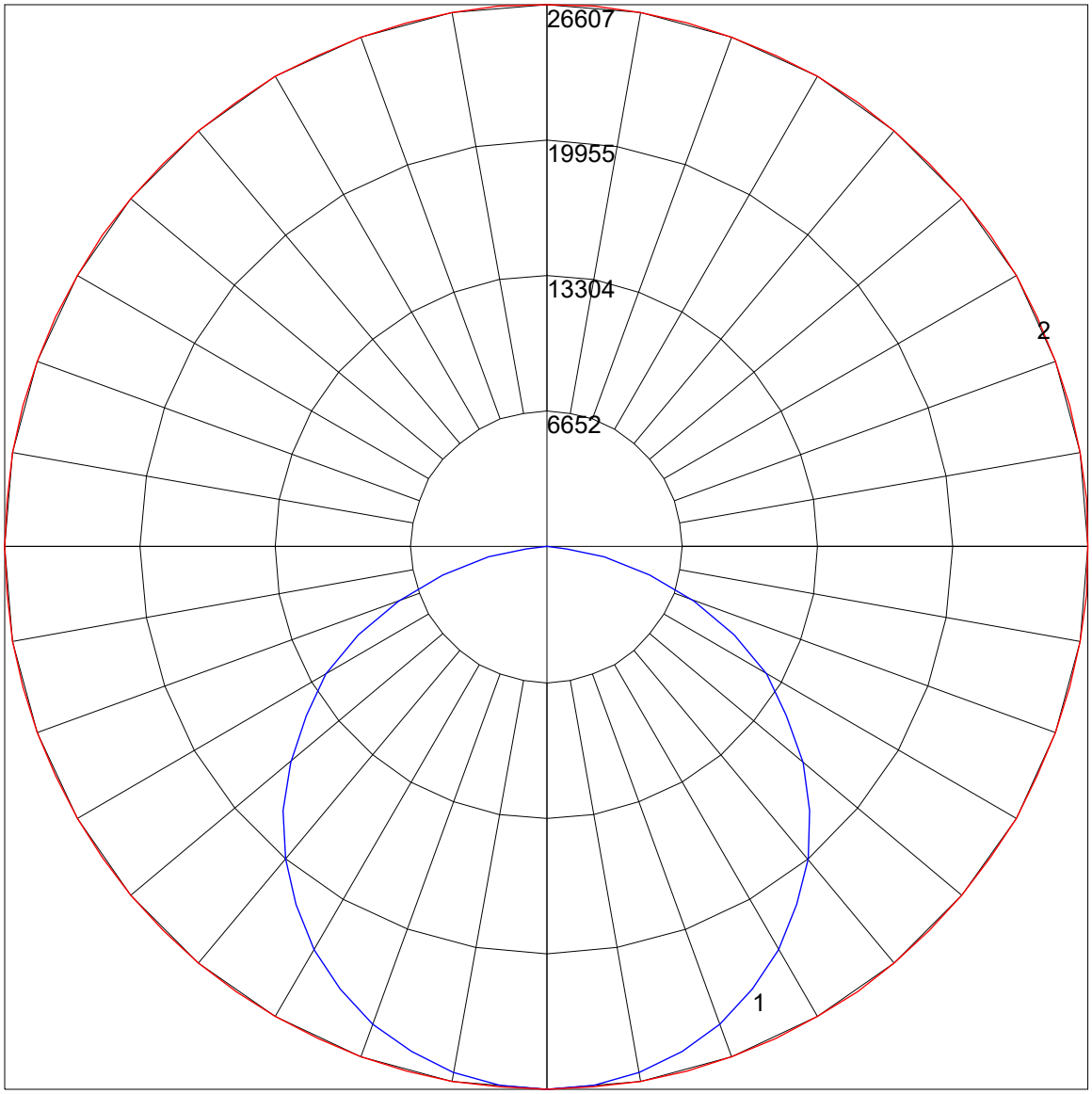
PHOTOMETRIC FILENAME : L101705402.IES

POLAR GRAPH



Maximum Candela = 26607 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180) (Through Max. Cd.)
2 - Horizontal Cone Through Vertical Angle (0) (Through Max. Cd.)