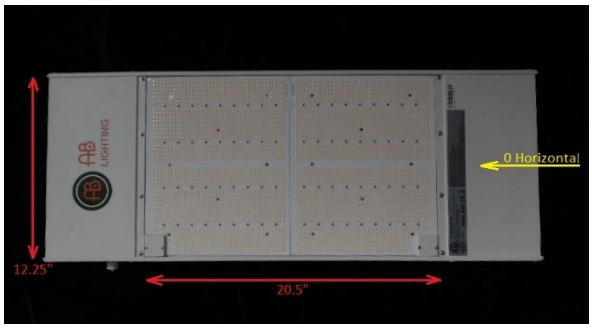
LightLab INTERNATIONAL ALLENTOWN LLC

Horticultural Lighting Test Report

LLIA001614-004

Catalog Number: AB840
Suspended, formed aluminum housing with a driver compartment on each end
aluminum mounting plate with formed heatsinks, no enclosure, open bottom.
2716 total LEDs - 2644 white LEDs and 72 red LEDs
Two uPowerTek BLD-400-C990-ENU-AYL000 LED drivers



Performance Summary

Electrical		
Voltage	277.0	Vac
Current	3.040	A
Power	817.7	W
Power Factor	0.971	
Current THD	7.1	%
Radiometric and Quantum		
Total Radiant Flux	441.93	W
Radiant Efficiency	0.540	
Total Photon Flux	2085.48	µmol·s^{-1}
Photon Flux Efficacy	2.550	µmol·J^{-1}
Horticultural		
PPF	2037.93	µmol·s^{-1}
PPE	2.492	µmol·J^{-1}
Far-Red Photon Flux	43.90	µmol·s^{-1}
PPFD Conversion Factor	15.03	µmol·s^{-1}·m^{-2}·klx^{-1}

Prepared For:
AB Lighting
11301 Carmel Commons Blvd
Suite 103
Charlotte, NC 28226, USA

Test date: 04/06/2022
Report date: 04/08/2022

Signed: Michael L. Grather

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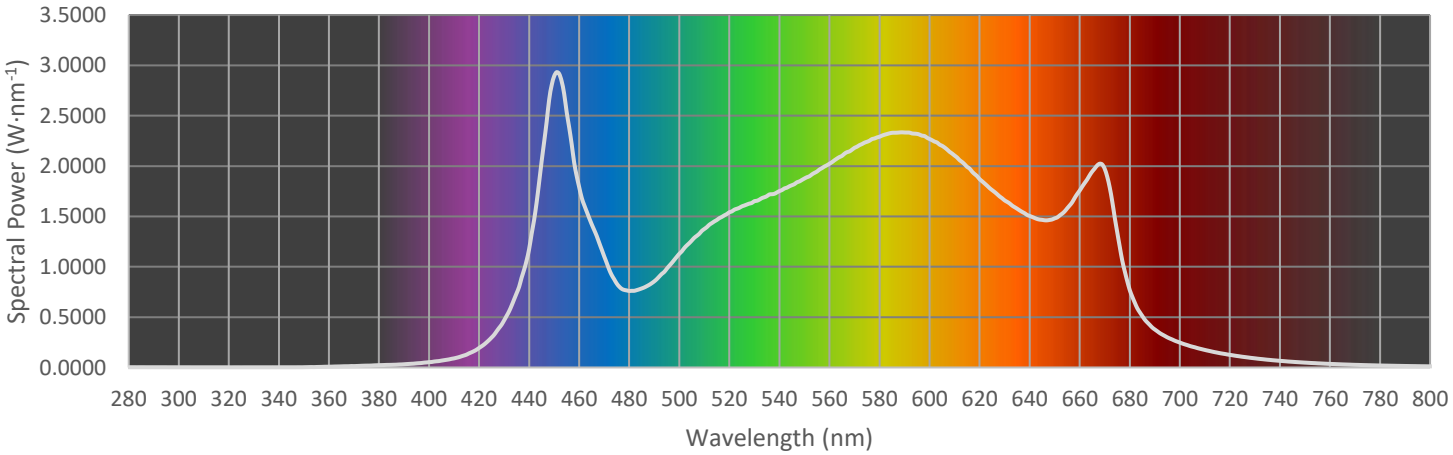
Radiant Flux Tabulation			
Waveband (nm)	Radiant Flux (W_r)	Percent of Total	Efficiency (W_r/W_e)
UV-B 280-315	0.07	0.0%	0.000
UV-A 315-400	1.08	0.2%	0.001
400-500	98.82	22.4%	0.121
500-600	187.6	42.5%	0.229
600-700	147.2	33.3%	0.180
Far-Red 700-800	7.22	1.6%	0.009
Total 280-800	441.9	100.0%	0.540
PAR 400-700	433.5	98.1%	0.530



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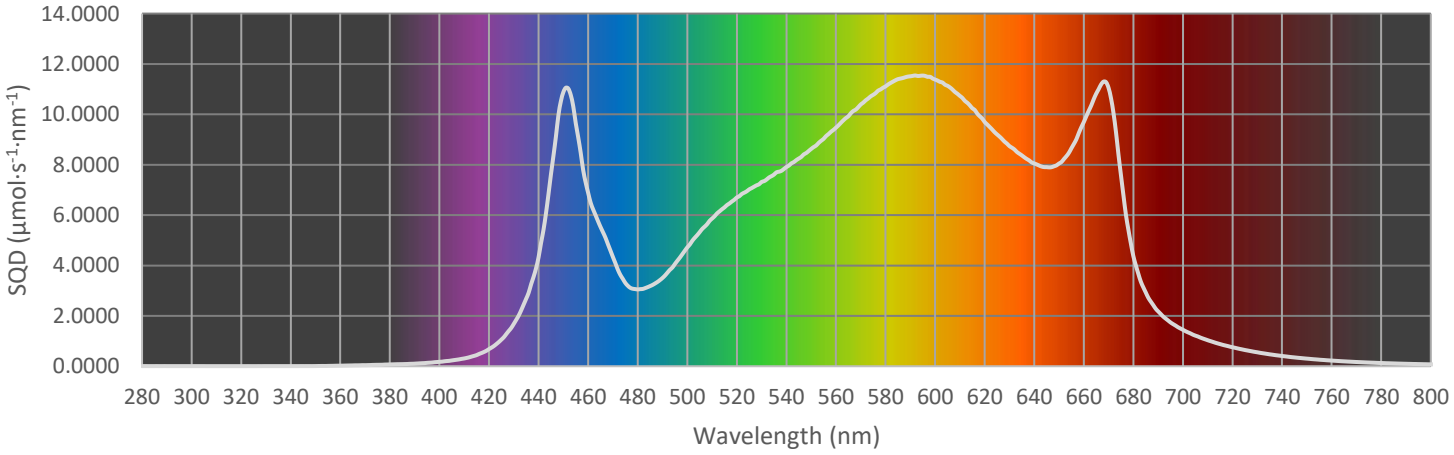
Photon Flux Tabulation			
Waveband (nm)	Photon Flux ($\mu mol \cdot s^{-1}$)	Percent of Total (%)	Photon Flux Efficacy ($\mu mol \cdot J^{-1}$)
UV-B 280-315	0.18	0.0%	0.000
UV-A 315-400	3.45	0.2%	0.004
400-500	379.3	18.2%	0.464
500-600	870.9	41.8%	1.065
600-700	787.7	37.8%	0.963
Far-Red 700-800	43.90	2.1%	0.054
Total 280-800	2085.5	100.0%	2.551
PAR 400-700	2037.9	97.7%	2.492



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Photosynthetically Active Radiation (PAR) Metrics (400-700nm)

Photosynthetic Photon Flux (PPF)	2037.93	$\mu mol \cdot s^{-1}$
Photosynthetic Photon Efficacy (PPE)	2.492	$\mu mol \cdot J^{-1}$
Photosynthetic Photon Efficacy (PPE)	8.973	$mol \cdot kWh^{-1}$
PPFD Conversion Factor	15.03	$\mu mol \cdot s^{-1} \cdot m^{-2} \cdot klx^{-1}$

Photobiologically Active Radiation (PBAR) Metrics (280-800nm)

PBAR Flux	2085.48	$\mu mol \cdot s^{-1}$
PBAR Efficacy	2.551	$\mu mol \cdot J^{-1}$

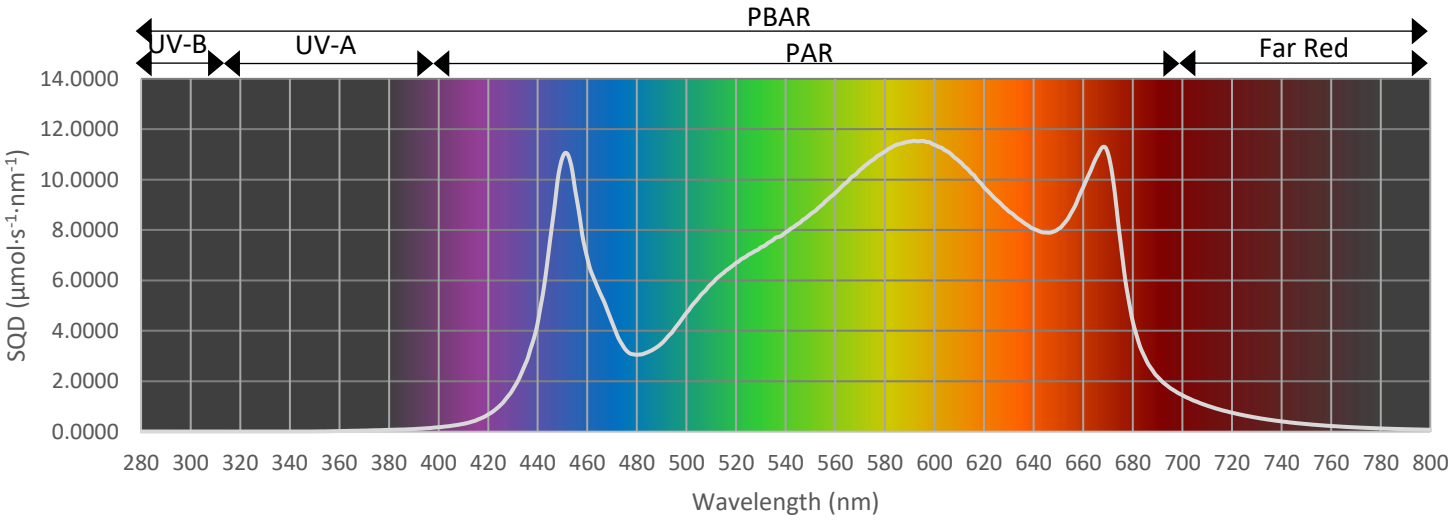
Yield Photon Flux (YPF) Metrics (Weighted 350-725nm)

YPF	1795.15	$\mu mol \cdot s^{-1}$
YPF Efficacy	2.195	$\mu mol \cdot J^{-1}$
Yield Efficiency (YPF/PPF)	88.1	%

Red and Far-Red Flux Metrics (700-800nm)

Far-Red Photon Flux	43.90	$\mu mol \cdot s^{-1}$
Red/Far-Red Ratio (R/FR Ratio)	14.84	

Note: for R/FR Ratio, Red Range=640-680nm, Far-Red Range=710-750nm



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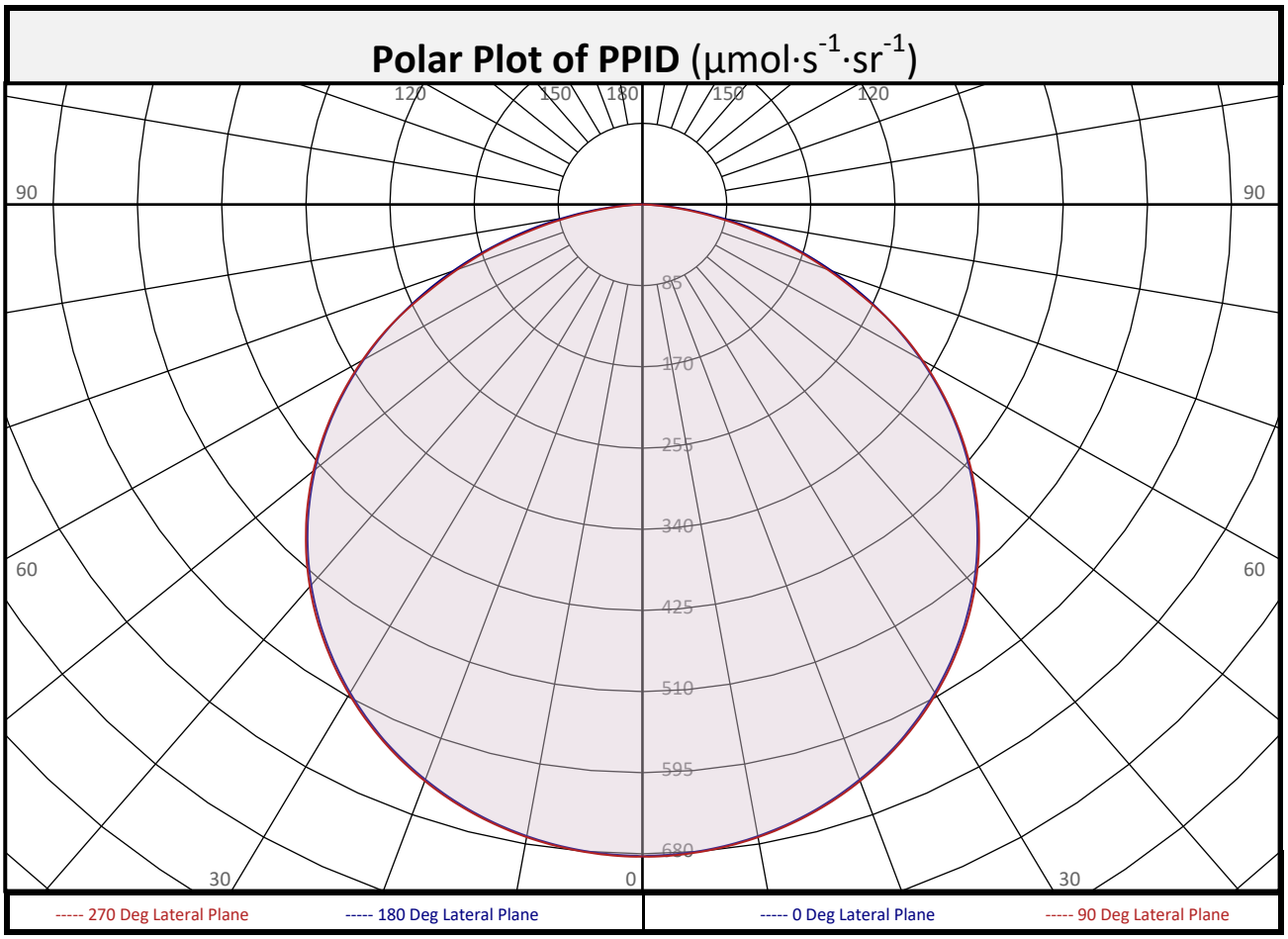

Zonal PPF Summary									
Zone (Deg Vert)	PPF (µmol·s^{-1})	Percent of Total	Zone (Deg Vert)	PPF (µmol·s^{-1})	Percent of Total	Zone (Deg Vert)	PPF (µmol·s^{-1})	Percent of Total
0-10	64.7	3.2%	90-100	0.0	0.0%	0-20	251.0	12.3%
10-20	186.3	9.1%	100-110	0.0	0.0%	0-30	536.5	26.3%
20-30	285.5	14.0%	110-120	0.0	0.0%	0-40	886.3	43.5%
30-40	349.8	17.2%	120-130	0.0	0.0%	0-60	1597	78.4%
40-50	369.8	18.1%	130-140	0.0	0.0%	0-80	2005	98.4%
50-60	340.6	16.7%	140-150	0.0	0.0%	10-90	1973	96.8%
60-70	262.3	12.9%	150-160	0.0	0.0%	20-50	1005	49.3%
70-80	146.1	7.2%	160-170	0.0	0.0%	40-90	1152	56.5%
80-90	32.8	1.6%	170-180	0.0	0.0%	60-90	441.3	21.7%
0-90	2038	100.0%	90-180	0.0	0.0%	0-180	2038	100.0%

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Circle of Light Plot

Height(m)	PPFD at Nadir (µmol·s^{-1}·m^{-2})	Ground-level distance to half-of-nadir PPFD (m) 0-180 deg	90-270 deg
0.5	2731.3	0.64	0.64
1.0	682.8	1.28	1.29
1.5	303.5	1.93	1.93
2.0	170.7	2.57	2.58
2.5	109.3	3.21	3.22
3.0	75.9	3.85	3.87

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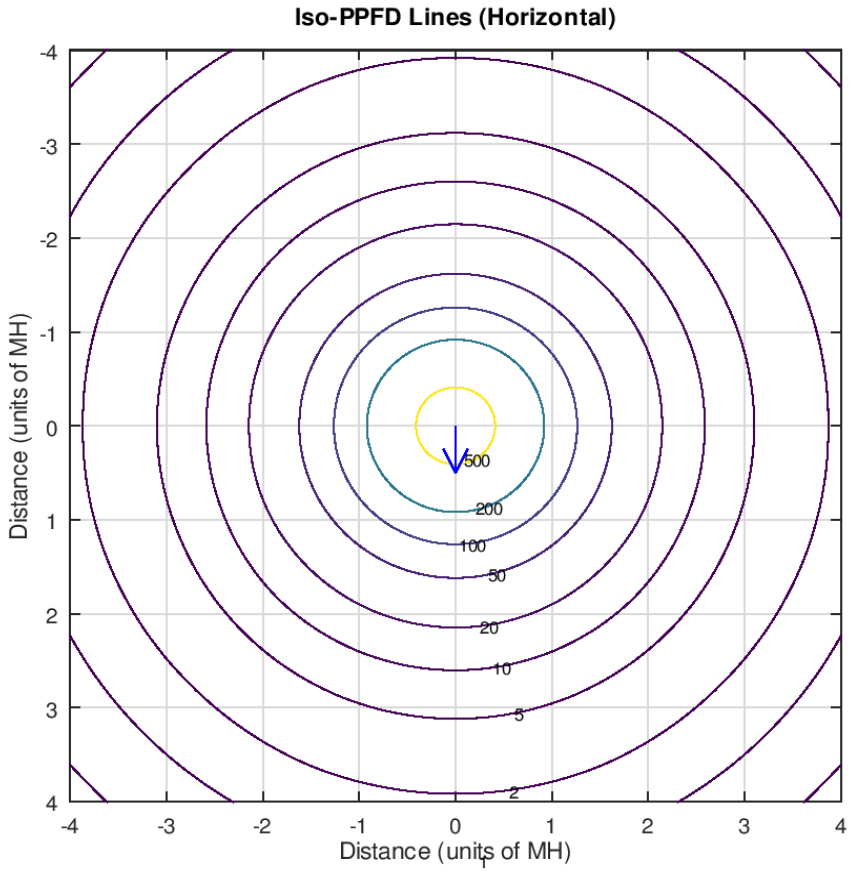
Iso-PPFD Plot



The PPFD values shown in the plot above are based on a mounting height of h = 1.0 m. Grid values show multiples of mounting height. The isoilluminance contour lines are expressed in units of umol/s/m^2. The values expressed are based on the direct light from a single unit without the contribution of room reflections.

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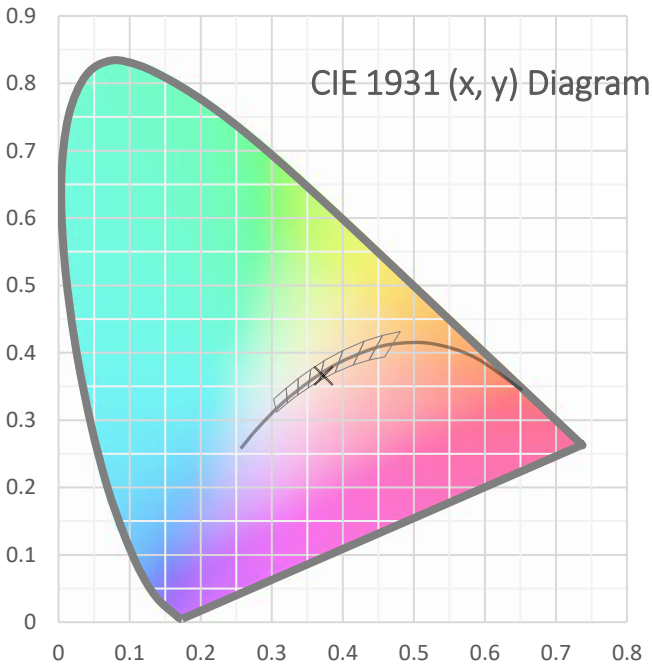
Electrical Data

Voltage	277.0	Vac
Current	3.040	A
Power	817.7	W
Frequency	59.99	Hz
Power Factor	0.971	
Current THD	7.1	%

Photometric (Human Vision) Data

Total Luminous Flux		135570.1	lm
Luminous Efficacy		165.8	lm/W
Chromaticity	(x,y)	(0.3731, 0.3658)	
	(u',v')	(0.2246, 0.4956)	
Duv		-0.0030	
CCT		4129	K
CRI (Ra)		85	
R9		29	
TM-30: Rf		83	
TM-30: Rg		97	



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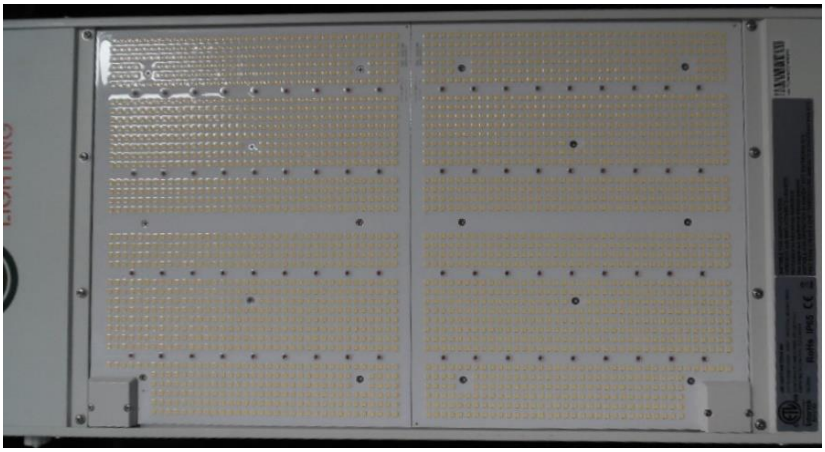
Additional Pictures of Test Subject



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Test Equipment Configuration:	Measurements acquired using the LightLab International Allentown, LLC Labsphere 2m Integrating Sphere system with spectroradiometer. Testing was performed using 4π geometry Intensity measurements were acquired using the LightLab International Allentown, LLC goniometer with a test distance of 9.5m.
Test Temperature:	25.6 °C
Test Procedure:	Tested in accordance with the applicable sections of: LM-79-19, LM-78-20, LM-58-20, ANSI_ANSLG C78.377-2017, TM-30-20
Significance:	The laboratory has not participated in the selection of samples to be tested. All testing is performed on the understanding that the significance of the report is limited to the extent that the test sample is representative of production units.
Notes:	The measurements and other derived quantities contained in this report are based on the absolute data as measured. Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results. This report is free of erasures and corrections

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