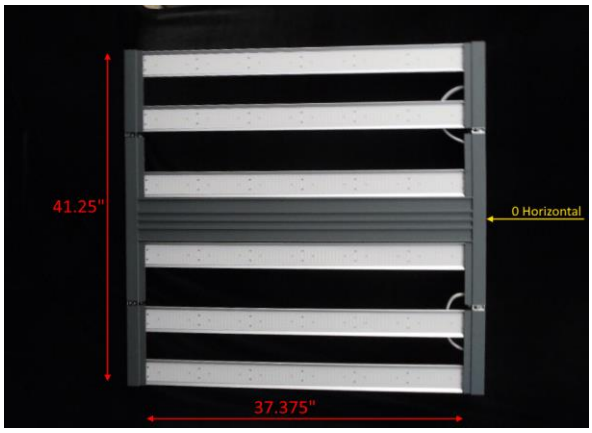
LightLab INTERNATIONAL ALLENTOWN LLC

Horticultural Lighting Test Report

LLIA001614-002

Catalog Number: AB960
Suspended, extruded aluminum assembly with six LED light bars and one central driver compartment between two end supports, open bottom.
3312 total LEDs - 3240 white LEDs and 72 red LEDs
Three Inventronics EUM-320S760MG LED drivers



Performance Summary

Electrical		
Voltage	277.0	Vac
Current	3.603	A
Power	952.1	W
Power Factor	0.954	
Current THD	8.5	%
Radiometric and Quantum		
Total Radiant Flux	539.54	W
Radiant Efficiency	0.567	
Total Photon Flux	2552.14	$\mu mol \cdot s^{-1}$
Photon Flux Efficacy	2.681	$\mu mol \cdot J^{-1}$
Horticultural		
PPF	2494.05	$\mu mol \cdot s^{-1}$
PPE	2.620	$\mu mol \cdot J^{-1}$
Far-Red Photon Flux	54.74	$\mu mol \cdot s^{-1}$
PPFD Conversion Factor	14.85	$\mu mol \cdot s^{-1} \cdot m^{-2} \cdot klx^{-1}$

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

Test date: 12/21/2021
Report date: 12/23/2021

Signed: Michael L. Grather

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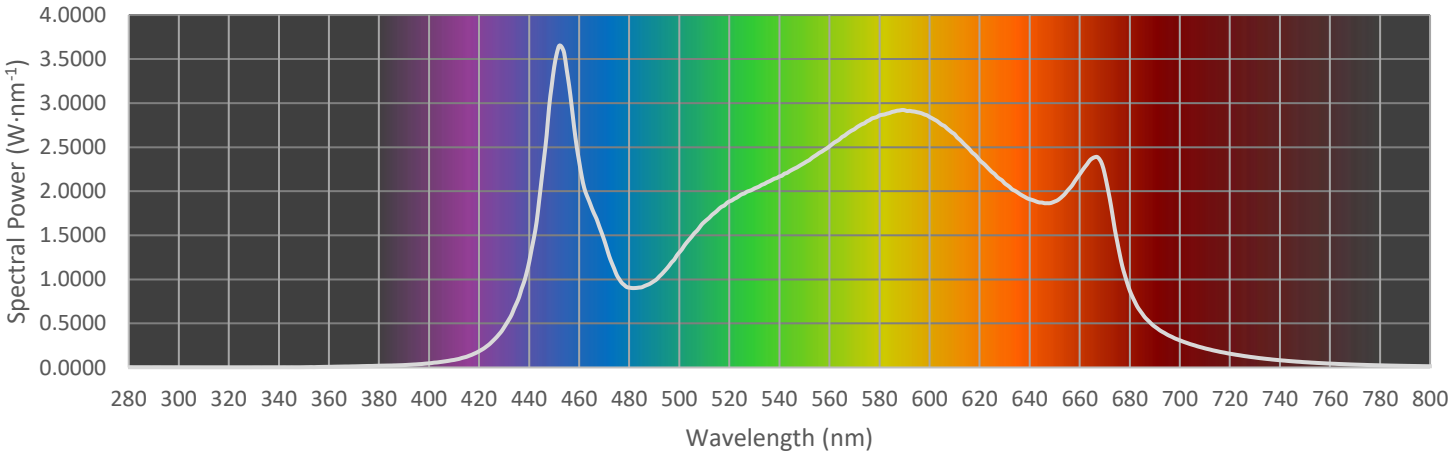
Radiant Flux Tabulation			
Waveband (nm)	Radiant Flux (W_r)	Percent of Total	Efficiency (W_r/W_e)
UV-B 280-315	0.09	0.0%	0.000
UV-A 315-400	0.98	0.2%	0.001
400-500	116.3	21.6%	0.122
500-600	231.6	42.9%	0.243
600-700	181.5	33.6%	0.191
Far-Red 700-800	9.01	1.7%	0.009
Total 280-800	539.5	100.0%	0.567
PAR 400-700	529.5	98.1%	0.556



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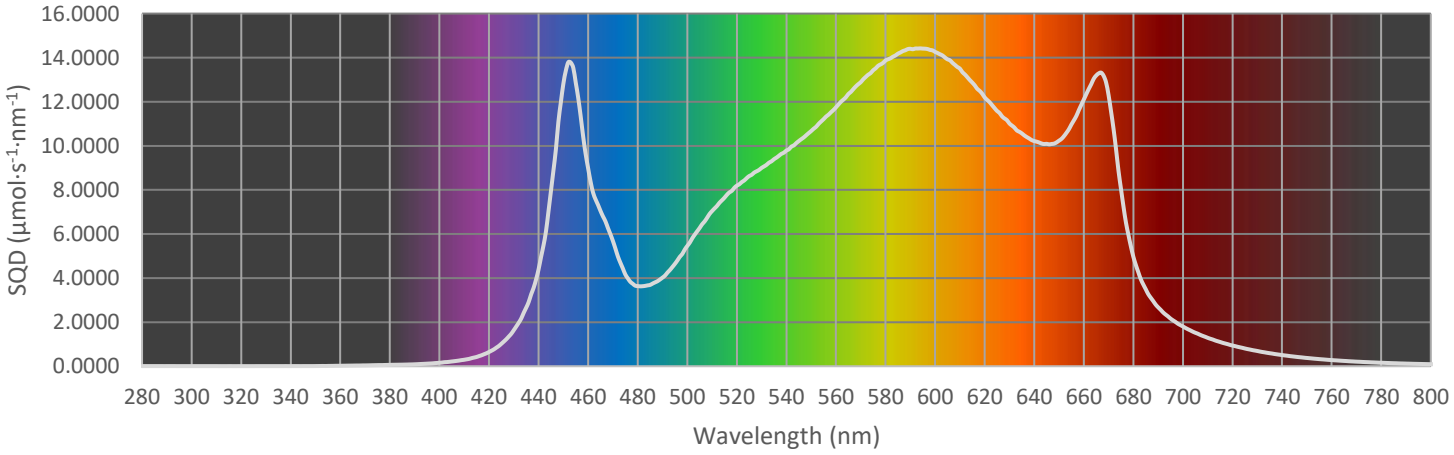
Photon Flux Tabulation			
Waveband (nm)	Photon Flux ($\mu mol \cdot s^{-1}$)	Percent of Total (%)	Photon Flux Efficacy ($\mu mol \cdot J^{-1}$)
UV-B 280-315	0.22	0.0%	0.000
UV-A 315-400	3.11	0.1%	0.003
400-500	447.5	17.5%	0.470
500-600	1076.0	42.2%	1.130
600-700	970.5	38.0%	1.019
Far-Red 700-800	54.74	2.1%	0.057
Total 280-800	2552.1	100.0%	2.681
PAR 400-700	2494.1	97.7%	2.620



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

Photosynthetic Photon Flux (PPF)	2494.05	$\mu mol \cdot s^{-1}$
Photosynthetic Photon Efficacy (PPE)	2.620	$\mu mol \cdot J^{-1}$
Photosynthetic Photon Efficacy (PPE)	9.430	$mol \cdot kWh^{-1}$
PPFD Conversion Factor	14.85	$\mu mol \cdot s^{-1} \cdot m^{-2} \cdot klx^{-1}$

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

PBAR Flux	2552.14	$\mu mol \cdot s^{-1}$
PBAR Efficacy	2.681	$\mu mol \cdot J^{-1}$

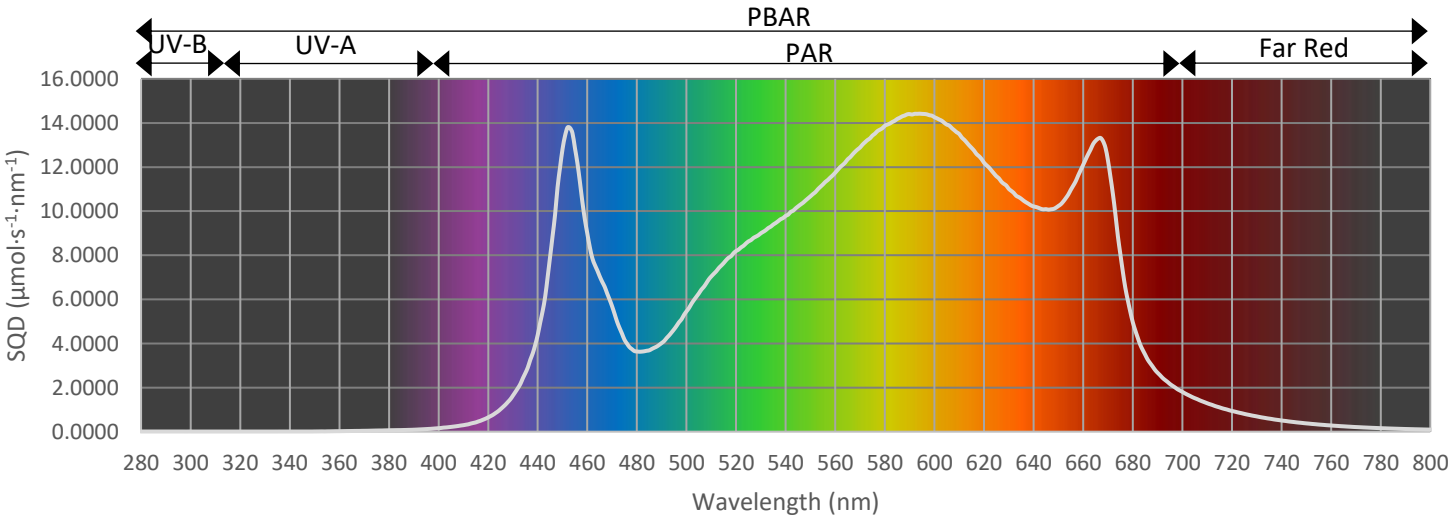
Yield Photon Flux (YPF) Metrics (Weighted 350-725nm)

YPF	2201.42	$\mu mol \cdot s^{-1}$
YPF Efficacy	2.312	$\mu mol \cdot J^{-1}$
Yield Efficiency (YPF/PPF)	88.3	%

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

Far-Red Photon Flux	54.74	$\mu mol \cdot s^{-1}$
Red/Far-Red Ratio (R/FR Ratio)	14.35	

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



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Report of Test

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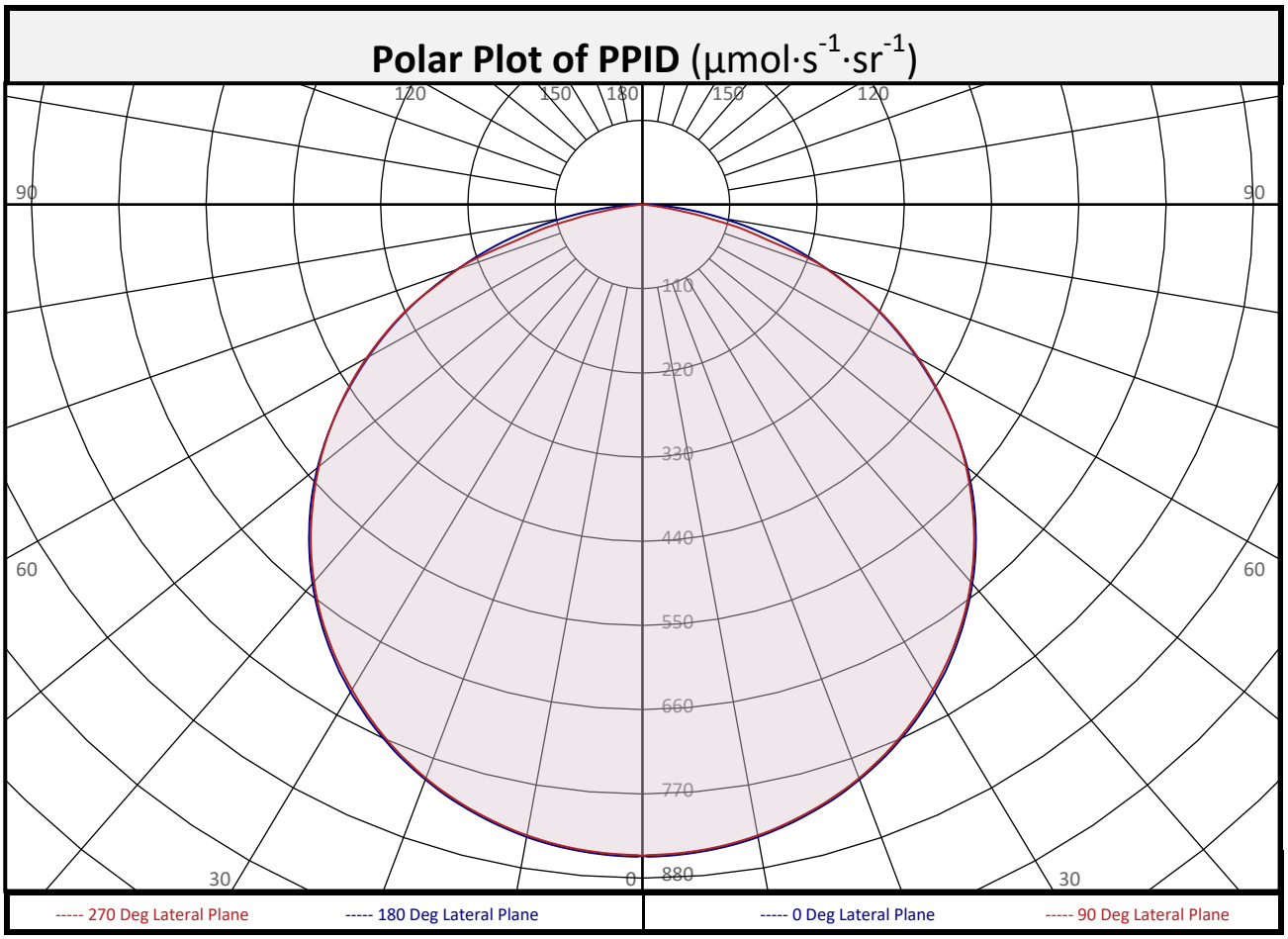

Zonal PPF Summary									
Zone (Deg Vert)	PPF (µmol·s^{-1})	Percent of Total	Zone (Deg Vert)	PPF (µmol·s^{-1})	Percent of Total	Zone (Deg Vert)	PPF (µmol·s^{-1})	Percent of Total
0-10	80.7	3.2%	90-100	0.0	0.0%	0-20	312.6	12.5%
10-20	231.9	9.3%	100-110	0.0	0.0%	0-30	667.4	26.8%
20-30	354.7	14.2%	110-120	0.0	0.0%	0-40	1101	44.1%
30-40	433.4	17.4%	120-130	0.0	0.0%	0-60	1976	79.2%
40-50	456.6	18.3%	130-140	0.0	0.0%	0-80	2470	99.0%
50-60	418.8	16.8%	140-150	0.0	0.0%	10-90	2413	96.8%
60-70	322.6	12.9%	150-160	0.0	0.0%	20-50	1245	49.9%
70-80	171.2	6.9%	160-170	0.0	0.0%	40-90	1393	55.9%
80-90	24.1	1.0%	170-180	0.0	0.0%	60-90	517.9	20.8%
0-90	2494	100.0%	90-180	0.0	0.0%	0-180	2494	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	3404.5	0.64	0.64
1.0	851.1	1.28	1.28
1.5	378.3	1.93	1.92
2.0	212.8	2.57	2.56
2.5	136.2	3.21	3.20
3.0	94.6	3.85	3.84

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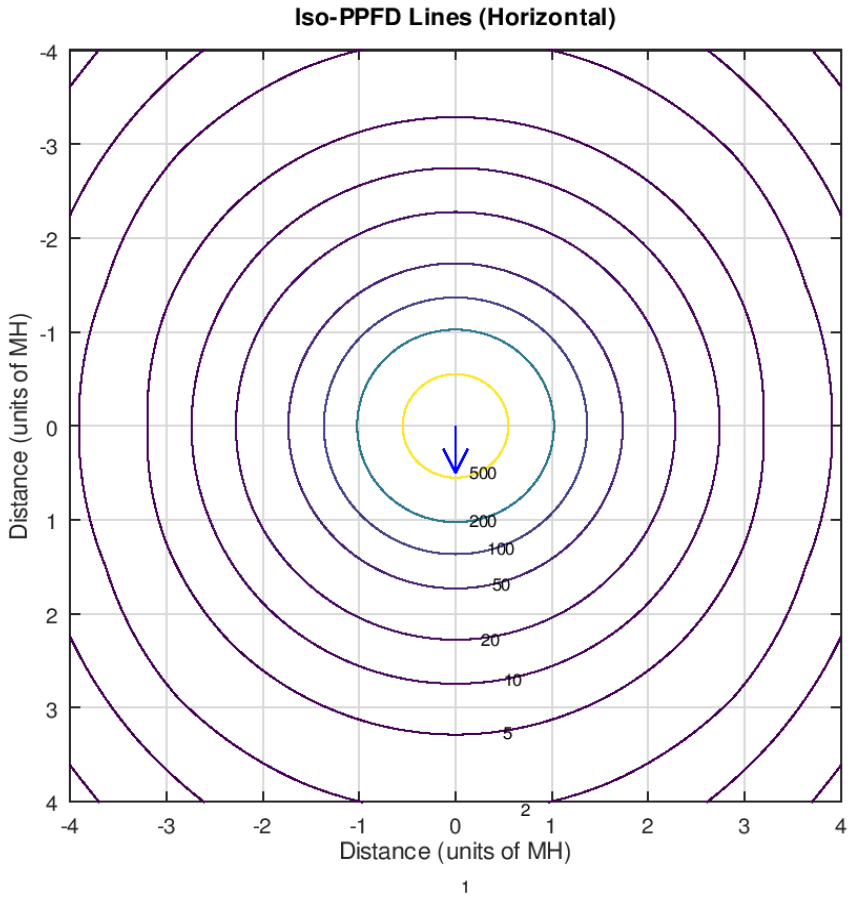
Iso-PPFD Plot



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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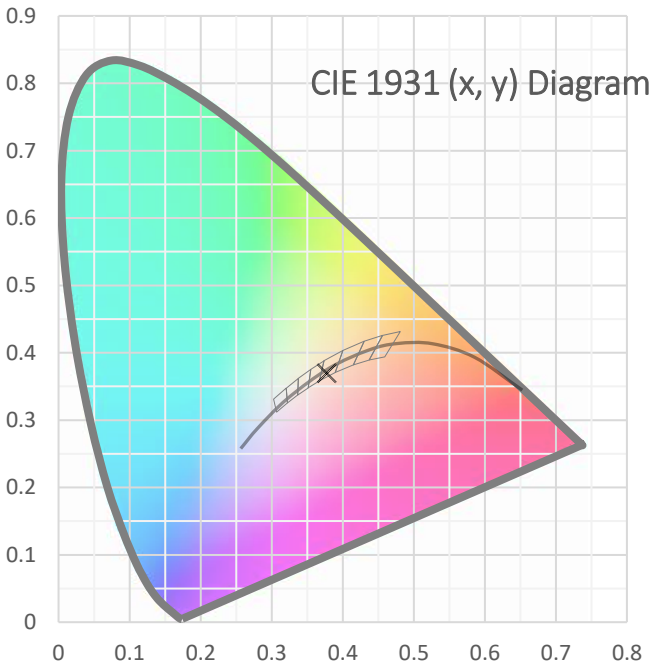
Electrical Data

Voltage	277.0	Vac
Current	3.603	A
Power	952.1	W
Frequency	59.99	Hz
Power Factor	0.954	
Current THD	8.5	%

Photometric (Human Vision) Data

Total Luminous Flux		167924.3	lm
Luminous Efficacy		176.4	lm/W
Chromaticity	(x,y)	(0.3776, 0.3698)	
	(u',v')	(0.2261, 0.4981)	
Duv		-0.0025	
CCT		4026	K
CRI (Ra)		85	
R9		26	
TM-30: Rf		83	
TM-30: Rg		96	



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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:	25.5 °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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