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Horticultural Lighting Test Report

Relevant Standards
IES LM-51-2013, ANSI C82.77-2002, CIE 13.3-1995
CIE 15-2004, IES TM-30-2015

Prepared For
Sunlight Supply Inc

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Catalog Number
Par Pro Hyper Arc 1100 – 901942

Order Number
11644261
Test Number
11644261.01C

Revised:
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Test Date

2017-02-20

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The results contained in this report pertain only to the tested sample.
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Lamp: Hyper Arc 1100
Mounting: VBU
Ballast/Driver: Galaxy DE 902682

Lamp



Summary of Results

Radiant Flux:	630600 mW
Luminous Flux:	177900 lm
Lamp Efficacy:	144.6 lm/W
CCT:	1997 K
CRI (Ra):	35.5
Chromaticity (x):	0.5331
Chromaticity (y):	0.4216
Chromaticity (u):	0.3049
Chromaticity (v):	0.3617
Duv:	0.0027

Testing was performed in a 3-meter integrating sphere using the 4π geometry method.
Absorption correction was employed for this measurement.



Horticultural Lighting - Integrating Sphere

Summary of Results

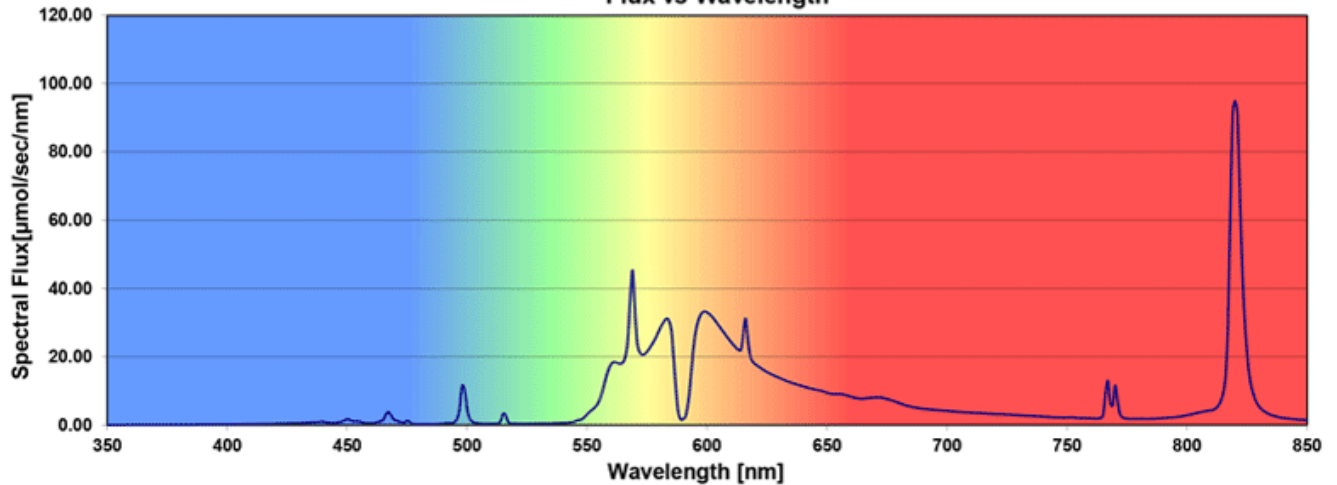
Radiant Flux	630.60 Watts	Radiant Efficiency:	51.3 %
Luminous Flux:	177900 Lumens	Luminous Efficacy:	144.63 lm/W
PPF (400-700nm):	2380.67 $\mu\text{mol}/\text{sec}$	PPF Efficacy:	1.9355 $\mu\text{mol}/\text{sec}/\text{W}$
PBAR Flux(350-800nm):	2688.39 $\mu\text{mol}/\text{sec}$	PBAR Efficacy:	2.1857 $\mu\text{mol}/\text{sec}/\text{W}$
Lumens to $\mu\text{mol}/\text{sec}$ conversion factor: 0.013382 $\mu\text{mol}/\text{sec}/\text{lm}$			

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	Wavelength Range [nm]	Photon Flux [$\mu\text{mol}/\text{sec}$]
UVA	350 - 360	0.638719
	360 - 370	0.767027
	370 - 380	1.000997
	380 - 390	1.353914
	390 - 400	1.966173
Violet	400 - 410	2.874705
	410 - 420	3.746694
	420 - 430	5.206905
	430 - 440	7.750990
Blue	440 - 450	9.131332
	450 - 460	10.061953
	460 - 470	17.703366
	470 - 480	7.937779
Blue	480 - 490	3.170427
	490 - 500	35.737388
	500 - 510	9.521837
Cyan	510 - 520	11.501822
	520 - 530	4.398685
Green	530 - 540	5.286287
	540 - 550	13.022919
	550 - 560	87.665692
Yellow	560 - 570	244.832815
	570 - 580	235.087046
	580 - 590	201.649251

	Wavelength Range [nm]	Photon Flux [$\mu\text{mol}/\text{sec}$]
Orange	590 - 600	212.589391
	600 - 610	289.613755
	610 - 620	232.471983
	620 - 630	156.457801
	630 - 640	125.080226
Red	640 - 650	104.276170
	650 - 660	89.847895
	660 - 670	79.337606
	670 - 680	75.421586
	680 - 690	54.697422
	690 - 700	44.585846
	700 - 710	38.902161
Infrared	710 - 720	34.474820
	720 - 730	30.925704
	730 - 740	27.111975
	740 - 750	23.243729
	750 - 760	21.344733
	760 - 770	52.056916
	770 - 780	30.987953
	780 - 790	19.001247
	790 - 800	23.947766

Flux vs Wavelength





Horticultural Lighting - Definition of Terms

Radiant Flux: The measured radiant power of the test item in units of watts from 350nm to 850 nm.

Luminous Flux: The measured radiant power of the test item in units of lumens from 380nm to 780 nm.

PPF (400-700nm): Photosynthetic Photon Flux - Flux from 400 to 700 nm expressed in units of $\mu\text{mol}/\text{sec}$
This wavelength range has been identified as important to photosynthetic processes.

PBAR Flux(350-800nm): Plant Biologically Active Radiation Flux - Flux from 350 to 800 nm expressed in units of $\mu\text{mol}/\text{sec}$. Plants have photopigments other than chlorophyll that are sensitive to a wider range of wavelengths than chlorophyll.

Radiant Efficiency: The ratio of light flux in watts to electrical input power in watts expressed in percent.

Luminous Efficacy: The ratio of light flux in lumens to electrical input power in watts expressed in lm/W .

PPF Efficacy: The ratio of photosynthetic photon flux to electrical input power in watts expressed in $\mu\text{mol}/\text{sec}/\text{W}$.

PBAR Efficacy: The ratio of photon flux in the wavelength range 350 to 800 nm to electrical input power in watts expressed in $\mu\text{mol}/\text{sec}/\text{W}$.

PPFD: Photosynthetic Photon Flux Density - Flux per unit area expressed in $\mu\text{mol}/\text{sec}/\text{m}^2$.

Lumens to $\mu\text{mol}/\text{sec}$ conversion factor: Multiply flux in lumens by this factor to convert to PPF in units of $\mu\text{mol}/\text{sec}$. This conversion factor can also be used to convert illuminance in lux to photosynthetic photon flux density (PPFD).

To convert from footcandles to PPFD first convert the illuminance in fc to lux by multiplying by 10.7639 lux/fc and then use the lumens to $\mu\text{mol}/\text{sec}$ conversion factor.

Note: This factor applies to the measured spectral distribution only and cannot be applied to other light sources.