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Horticultural Lighting Test Report

Relevant Standards
IES LM-79-2008, ANSI C82.77-2002, CIE 13.3-1995
CIE 15-2004, ANSI C78.377-2015, IES TM-30-2015

Prepared For

TopGrow Lighting
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Catalog Number

TGT5-24W65K

Order Number
11854719
Test Number
11854719.01B
Revised
2017-07-17
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2017-07-14

Prepared By

Austin Duff, Technician

Approved By

Eric Gaudreau, Senior Engineering Associate

Luminaire Description: Agrobrite FLT44, White metal housing with specular reflector
Lamp: Four (4) 4' T5 LED 6500K Lamps
Lamp Catalog Number: TGT5-24W65K
Mounting: Pendant
Ballast/Driver: One (1) Fulham Workhorse WH7-120-L

Luminaire

Summary of Results

Radiant Flux:	41610 mW
Luminous Flux:	12850 lm
Luminaire Efficacy:	125.5 lm/W
CCT:	6515 K
CRI (Ra):	84.5
Chromaticity (x):	0.3115
Chromaticity (y):	0.3357
Chromaticity (u):	0.1945
Chromaticity (v):	0.3144
Duv:	0.0071

Test Conditions

Test Temperature:	25.1	°C
Voltage:	120.1	VAC
Current:	0.9327	A
Power:	102.4	W
Power Factor:	0.915	
Frequency:	60	Hz
Current THD:	43.6	%

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

Integrating Sphere Test Conditions

Temperature	Voltage	Current	Power	Power Factor	Frequency	Current THD
25.1 °C	120.1 VAC	0.9327 A	102.4 W	0.915	60 Hz	43.6 %

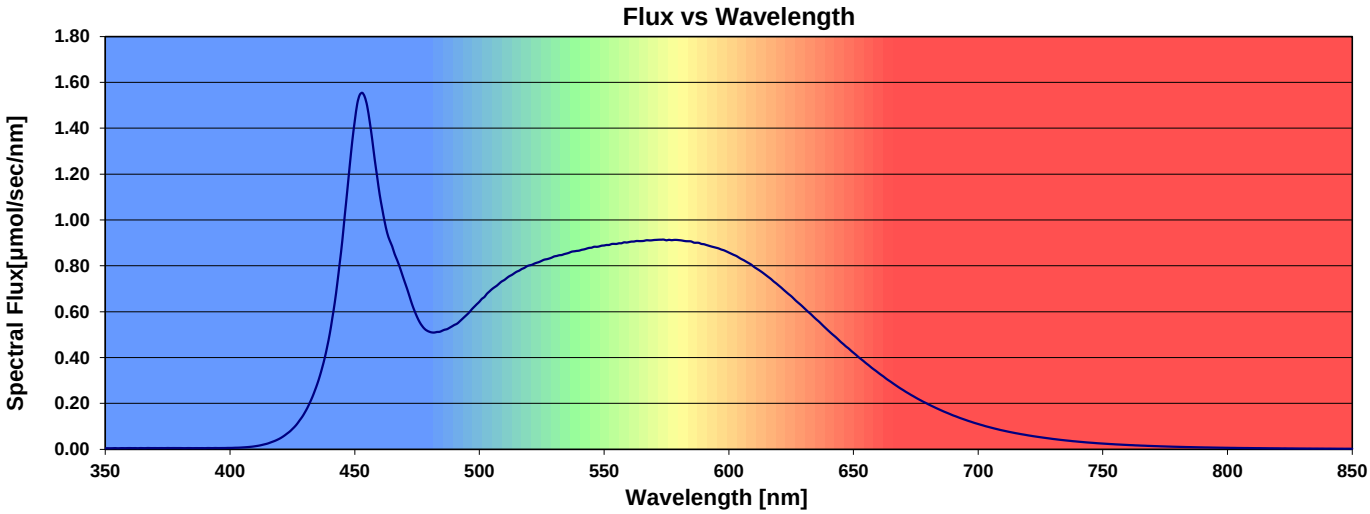
Summary of Results

Radiant Flux	41.61 Watts	**Radiant Efficiency:**	40.6 %
Luminous Flux:	12850 Lumens	**Luminous Efficacy:**	125.49 lm/W
PPF (400-700nm):	183.85 µmol/sec	**PPF Efficacy:**	1.7954 µmol/sec/W
PBAR Flux(350-800nm):	187.65 µmol/sec	**PBAR Efficacy:**	1.8325 µmol/sec/W

Lumens to µmol/sec conversion factor: 0.014307 µmol/sec/lm

	Wavelength Range [nm]	Photon Flux [µmol/sec]
UVA	350 - 360	0.050792
	360 - 370	0.051760
	370 - 380	0.053158
	380 - 390	0.051315
	390 - 400	0.054807
Violet	400 - 410	0.085411
	410 - 420	0.268737
	420 - 430	0.937804
	430 - 440	3.013396
	440 - 450	9.352307
Blue	450 - 460	14.141817
	460 - 470	8.938770
	470 - 480	5.935029
	480 - 490	5.197342
Cyan	490 - 500	5.893784
	500 - 510	6.951418
	510 - 520	7.729379
Green	520 - 530	8.211714
	530 - 540	8.542145
	540 - 550	8.790286
	550 - 560	8.965660
Yellow	560 - 570	9.086746
	570 - 580	9.130353
	580 - 590	9.041466

	Wavelength Range [nm]	Photon Flux [µmol/sec]
Orange	590 - 600	8.777460
	600 - 610	8.297092
	610 - 620	7.574891
	620 - 630	6.668805
	630 - 640	5.677120
Red	640 - 650	4.682985
	650 - 660	3.762969
	660 - 670	2.943733
	670 - 680	2.257658
	680 - 690	1.711594
	690 - 700	1.282107
Infrared	700 -710	0.952815
	710 - 720	0.707793
	720 - 730	0.526749
	730 - 740	0.389723
	740 - 750	0.288957
	750 - 760	0.216890
	760 - 770	0.163499
	770 - 780	0.123552
	780 - 790	0.094587
	790 - 800	0.073396



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 µmol/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 µmol/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 µmol/sec/W.

PBAR Efficacy: The ratio of photon flux in the wavelength range 350 to 800 nm to electrical input power in watts expressed in µmol/sec/W.

PPFD: Photosynthetic Photon Flux Density - Flux per unit area expressed in µmol/sec/m^2.

Lumens to µmol/sec conversion factor: Multiply flux in lumens by this factor to convert to PPF in units of µmol/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 µmol/sec conversion factor.

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

Horticultural Lighting - Nadir PPFD versus Mounting Height

PPFD Cone of Light Tabulation

Mounting Height [Inches]	Nadir PPFD [µmol/sec/m^2]
12	212.10
18	136.00
24	93.29
27	77.25
30	64.90
33	54.76
36	47.59
48	29.61