

LM-79 Report TEST REPORT NO.M648A

Test Result Summary

Luminaire Manufacturer	BLUETECH INDUSTRY CO.LTD.,
Luminaire Model Number	BT-CP-660W-EBCI
Input Voltage RMS (V)	240.06
Input Current RMS (A)	2.747
Input Power (W)	641.04
Light Output (lm)	91989
Luminous Efficacy (lm/W)	143.5
CCT (K)	3137
CRI	90.29
D _{uv}	-0.00517
Total Photon Flux (umoles/sec) (360-800 nm)	1519
Total Photon Efficacy (umoles/Joules)	2.37
PF	0.9718
THDi (%)	6.8

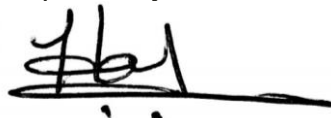
Prepared for:
 BLUETECH INDUSTRY CO. LTD.,
 Shenzhen, China

Date Issued: Oct 30, 2018

Date Tested: Oct 29, 2018

Prepared by:

Approved by:



Lumentra Inc.

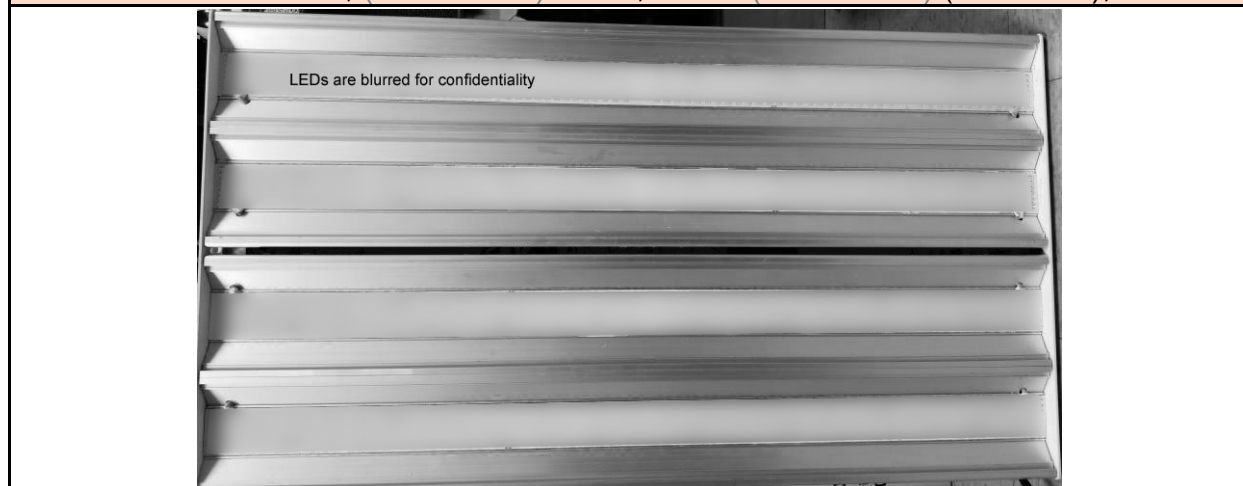
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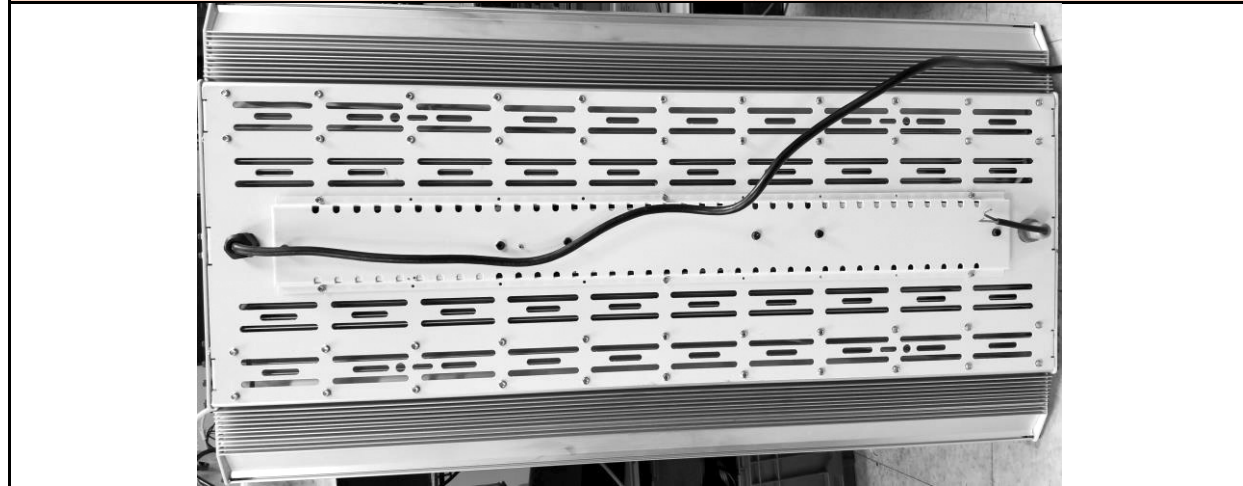
Revision History		
Date	Rev. #	Comments
	0	Initial Issue
	1	Confidential masking

Fixture Information

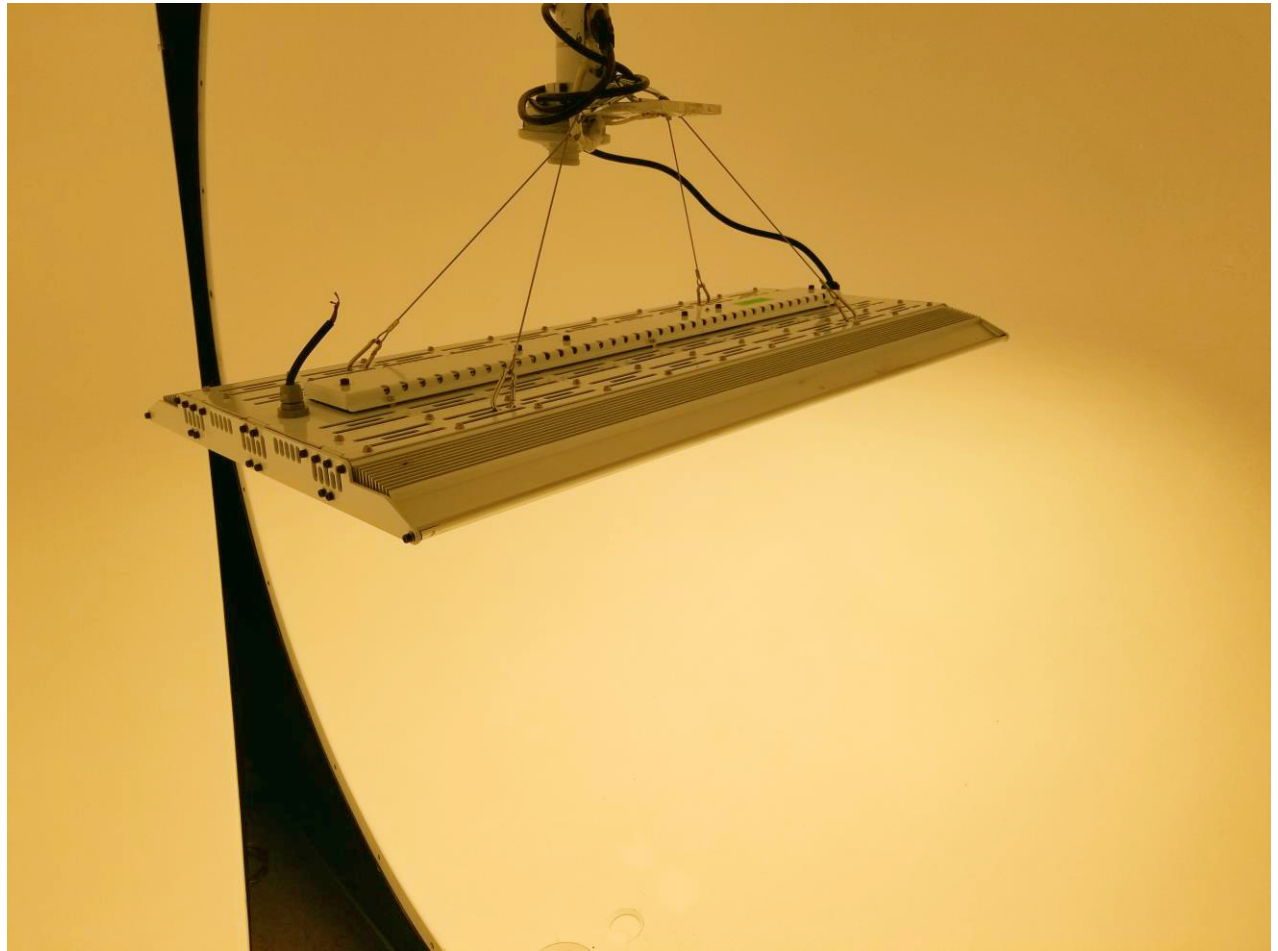
Bluetech Industry Co.,Ltd. Horticultural luminaire Canopus series, Cat. No: **BT-CP-660W-EBCI**. 950x520mm housing fitted with four custom Samsung Quantum Boards. Each board contains (confidential) pcs Samsung LM561B/S4 and (confidential) pcs Osram Oslon 660nm LEDs. Three constant current LED drivers, (confidential) brand, Model (confidential) (120-277V), max.



Luminous Opening



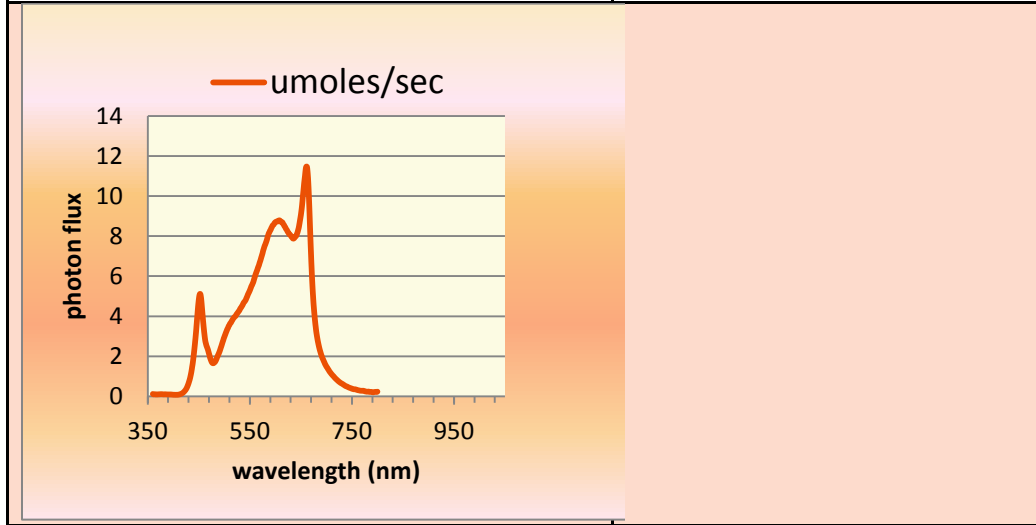
Rear view



Horticultural Luminaire suspended in the sphere for measurement

Light Output, Efficacy and Power Quality

Total Luminous Flux (lm)	91989
Luminous Efficacy (lm/W)	143.5
Input Voltage RMS (V)	240.06
Frequency (Hz)	60
Input Current RMS (A)	2.747
Input Power (W)	641.04
Power Factor	0.9718
Current Total Harmonic Distortion %	6.8
Ambient Temperature (°C)	25.9
Stabilization Time (Minute)	80



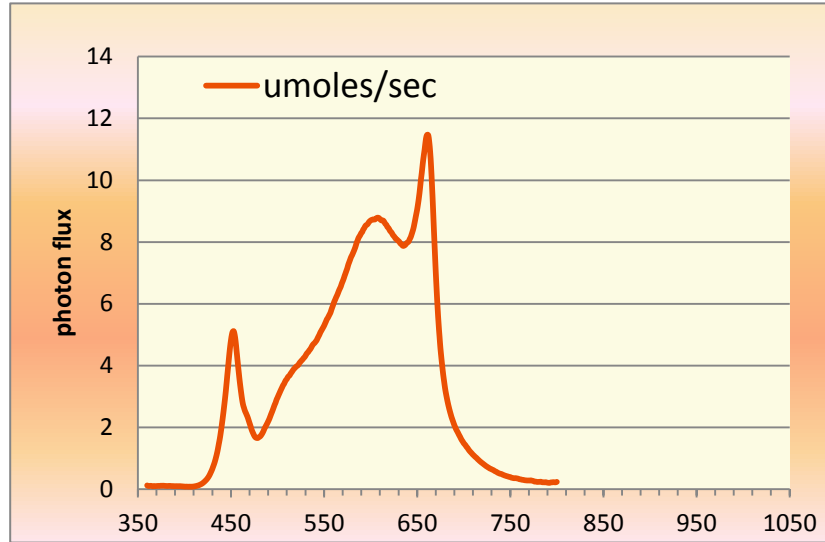
SPECTRAL QUANTUM DISTRIBUTION

Chromaticity

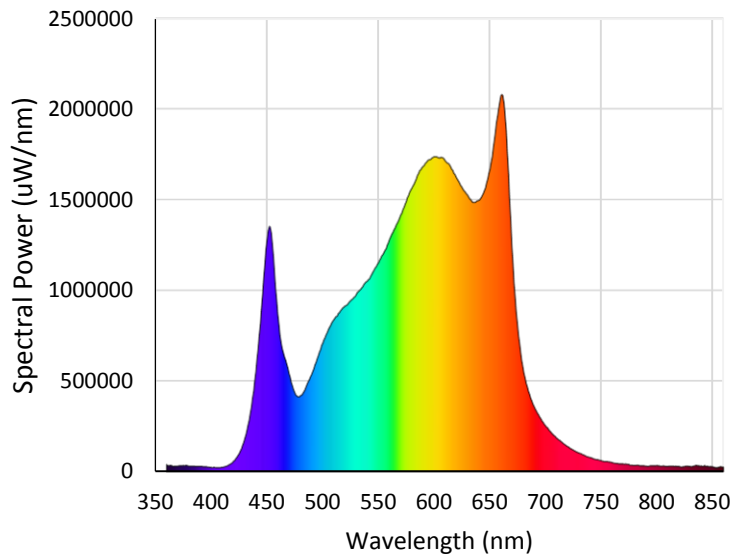
CIE Chromaticity Coordinate x	0.4206
CIE Chromaticity Coordinate y	0.3856
CIE Chromaticity Coordinate u'	0.2479
CIE Chromaticity Coordinate v'	0.5114
Duv	-0.00517
Correlated Colour Temperature CCT (K)	3137
Dominant Wavelength (nm)	584

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Spectral Quantum Distribution

















Spectral Power Distribution



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Colour Rendering Properties

Special Colour Rendering Index R_i	Test-Colour Sample Appearance under daylight	Swatch
$R_1 = 89.91$	Light greyish red	
$R_2 = 95.72$	Dark greyish yellow	
$R_3 = 96.79$	Strong yellow green	
$R_4 = 88.54$	Moderate yellowish green	
$R_5 = 90.54$	Light bluish green	
$R_6 = 93.39$	Light blue	
$R_7 = 89.07$	Light violet	
$R_8 = 78.36$	Light reddish purple	
$R_9 = 54.04$	Strong red	
$R_{10} = 90.41$	Strong yellow	
$R_{11} = 89.05$	Strong green	
$R_{12} = 81.02$	Strong blue	
$R_{13} = 91.62$	Light yellowish pink	
$R_{14} = 98.95$	Moderate olive green (leaf)	

General Colour Rendering Index (CRI)

$$R_a = \frac{1}{8} \sum_{i=1}^8 R_i = 90.29$$

Test Methods

Color qualities were measured using an integrating sphere with a spectrometer in 4π geometry. Self-absorption and spatial non-uniformity corrections were applied when applicable. The spectrometer bandwidth is less than 1.5 nm. The sample was tested in the orientation for its intended use. Tests were performed in accordance with LM-79:2008 Sections 9 and 12. All photometric measurement equipment was calibrated using a 75W omni-directional halogen standard lamp. All measurements are traceable to NIST.

All measurements were performed when the device under test was operated long enough to reach stabilization. Stability is reached when the variation of three readings of the light output and electrical power over a period of 30 min, taken 15 minutes apart, is less than 0.5 %. The uncertainty for sphere measured lumenous flux is +/- 1.5% and +/- 0.5% for CCT measurements ($k = 2$).

Applicable Standards and Operating Equipment

- IES LM-79:2008 (Sec. 9) Solid State Lighting Luminaires - Total Flux Measurements (Luminous Efficacy)
- IES LM-79:2008 (Sec. 10) Solid State Lighting Luminaires – Luminous Intensity Measurements
- IES LM-79:2008 (Sec. 12) Solid State Lighting Luminaires - Color Characteristic Measurements
- IES LM-58:1994 Spectroradiometric Measurements
- CIE Pub. 13.3:1995 Method of Measuring and Specifying Color Rendering of Light Sources
- IES LM-16:1993 Practical Guide to Colorimetry of Light Sources
- CIE Pub. 15:2004 Colorimetry
- ANSI C82.2:2002 Ballast for Fluorescent Lamps - Methods of Measurement
- ANSI C82.77:2002 Harmonic Emission Limits - Related Power Quality Requirements for Lighting Equipment
- ANSI/UL 1598:2008 (Secs. 19.7, 19.10-16) Luminaires
- ANSI/UL 153:2002 (Secs. 124-128A) Standard for Portable Electric Luminaires
- ANSI/UL 1574:2004 (Sec. 54) Standard for Track Lighting Systems

Equipment	Manufacturer	Model
76" Integrating Sphere	SphereOptics	TOCS-72
Spectrometer	SphereOptics	SMS-500
Digital Power Meter	Tektronix	PA4000
DC Power Supply	Agilent	E3634A
Spectral Flux Reference Standard	Labsphere	SCL-1400

END OF REPORT

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