



# REPORT

25800 COMMERCE DRIVE, LAKE FOREST, CA 92630

Project No. G102328456

Date: April 1, 2016

REPORT NO. 102328456LAX-045

TEST OF ONE LED CHORUS

MODEL NO. DW CHORUS 24 CW & WW

RENDERED TO

ELATION LIGHTING  
6122 S. EASTERN AVE  
COMMERCE CA 90040

TEST: Electrical and Photometric tests as required to the IESNA test standard.

STATEMENT OF LIMITATION: This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the federal government.

AUTHORIZATION: The testing performed was authorized by signed quote number Qu-00648726.

STANDARDS USED: The following American National Standards or Illuminating Engineering Society of North America Test Guides were used in part or totally to test each specimen:

IESNA LM-79 - 2008: Electrical and Photometric Measurements of Solid State Lighting

DESCRIPTION OF SAMPLE: The client submitted one prototype sample of model number DW CHORUS 24 CW & WW. The sample was received by Intertek on March 21, 2016, in undamaged condition and one sample was tested as received. The sample designation was LAN-1603210811-005.

DATES OF TESTS: March 29, 2016 through March 30, 2016.

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## SUMMARY

Model No.:	DW CHORUS 24 CW & WW
Description:	LED CHORUS

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	8271	8340
Total Power (W)	179.0	176.7
Luminaire Efficacy (LPW)	46.21	47.20

Criteria	Result
Power Factor	0.989
Current ATHD %	11.50
Correlated Color Temperature (CCT - K)	4027
Color Rendering Index (CRI - Ra)	76.5
Color Rendering Index (CRI - R9)	10.9
DUV	0.008
Chromaticity Coordinate (x)	0.375
Chromaticity Coordinate (y)	0.359
Chromaticity Coordinate (u')	0.228
Chromaticity Coordinate (v')	0.492

## EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date
LapSphere 3M Integrating Sphere	CA-11821-LRT	000830	03/07/16	04/07/16
LabSphere Spectrometer	CDS-3020	000834	03/07/16	04/07/16
California Instruments Power Supply	CSW5550	001339	VBU	VBU
Yokogawa Power Meter	WT333	001320	06/03/15	06/03/16
Extech Instruments Stop Watch	365510	001379	11/19/15	11/16/16
Temp. & RH Meter	971	001380	12/17/15	12/17/16
DC Power Supply	LPS-100-0833	000836	05/07/15	05/07/16
LSI High Speed Mirror Goniometer	6440T	000943	03/08/16	04/08/16
California Instruments Power Supply	CSW5550	001339	VBU	VBU
Yokogawa Power Analyzer	WT210	000945	12/04/15	12/04/16
Temp. & RH Meter	971	001380	12/17/15	12/17/16
Extech Instruments Stop Watch	9/23/2900	001379	11/19/15	11/19/16
Tape Measure	C1-25	000915	12/04/15	12/04/16

## TEST METHODS

### Seasoning in Sample Orientation – LED Products

No seasoning was performed in accordance with IESNA LM-79.

### Photometric and Electrical Measurements – Integrating Sphere Method

A Labsphere CDS 3020 Spectrometer and Three Meter Sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit.

Ambient temperature was measured at a position inside the sphere. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation. Each SSL unit was allowed to stabilize for at least thirty minutes before measurements were made. Electrical measurements including voltage, current, and power were measured using the Yokogawa Power Analyzer.

The calibration of the sphere spectrometer system is traceable to the National Institute of Standards and Technology.

### Photometric and Electrical Measurements – Distribution Method

A LSI Type C High Speed Model 6440 Mirror Goniometer was used to measure the intensity (candelas) at each angle of distribution for each sample.

Ambient temperature was measured equal to the height of the sample mounted on the Goniometer equipment. Each sample was operated at input rated voltage in its designated orientation. Each sample was allowed to stabilize for at least thirty minutes before measurements were made. Electrical measurements including voltage, current, and power were measured using the Yokogawa Power Analyzer.

Some graphics were created with Photometrics Plus software.

## RESULTS OF TEST

### Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) - Integrating Sphere Method

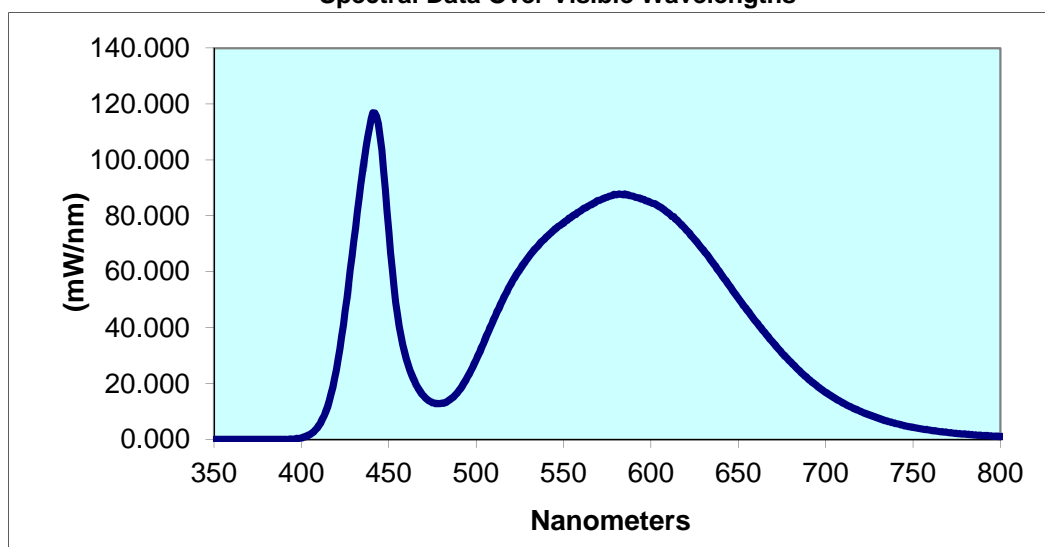
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
LAN-1603210811-005	UP	120.0	1508	179.0	0.9893	11.50	8271	46.21

Correlated Color Temperature (K)	CRI -Ra	CRI -R9	DUV	CIE 31' Chromaticity Coordinate	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
4027	76.5	10.9	0.008	0.375	0.359	0.228	0.492

### Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.014	440	114.900	530	65.430	620	75.120	710	13.060
355	0.014	445	108.700	535	69.030	625	71.580	715	11.460
360	0.014	450	74.150	540	72.360	630	67.710	720	10.070
365	0.014	455	44.580	545	75.220	635	63.580	725	8.798
370	0.014	460	29.000	550	77.560	640	59.270	730	7.617
375	0.014	465	20.410	555	79.880	645	54.810	735	6.601
380	0.014	470	15.530	560	81.860	650	50.530	740	5.731
385	0.014	475	13.170	565	83.820	655	46.260	745	4.980
390	0.014	480	12.890	570	85.500	660	42.240	750	4.335
395	0.145	485	14.260	575	86.740	665	38.310	755	3.788
400	0.610	490	17.380	580	87.560	670	34.550	760	3.323
405	1.889	495	22.310	585	87.790	675	30.980	765	2.881
410	5.022	500	28.630	590	87.080	680	27.660	770	2.488
415	11.890	505	35.730	595	85.970	685	24.570	775	2.157
420	24.940	510	42.900	600	84.760	690	21.690	780	1.903
425	45.880	515	49.670	605	83.250	695	19.120		
430	70.780	520	55.780	610	81.070	700	16.870		
435	96.070	525	60.850	615	78.430	705	14.880		

**Spectral Data Over Visible Wavelengths**



# RESULTS OF TEST (cont'd)

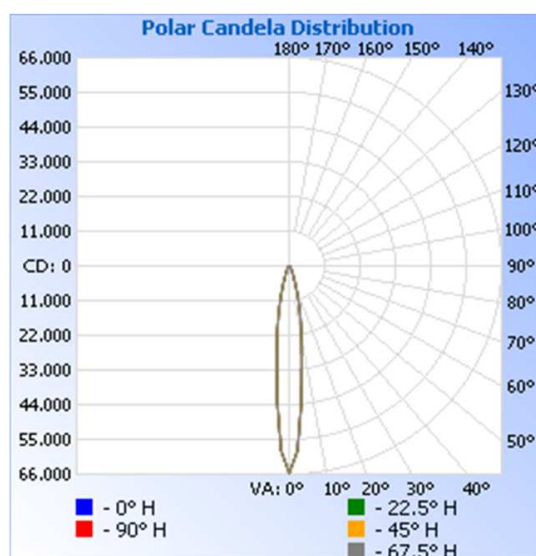
## Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) – Distribution Method

Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
LAN-1603210811-005	UP	120.0	1493	176.7	0.987	8340	47.2

## Intensity (Candlepower) Summary at 25°C - Candelas

Maximum Candela Value: 65,631.6

Angle	0	22.5	45	67.5	90
0	65632	65632	65632	65632	65632
5	43158	43158	43158	43158	43158
10	21724	21724	21724	21724	21724
15	10495	10495	10495	10495	10495
20	4586	4586	4586	4586	4586
25	2323	2323	2323	2323	2323
30	1317	1317	1317	1317	1317
35	681	681	681	681	681
40	355	355	355	355	355
45	218	218	218	218	218
50	151	151	151	151	151
55	114	114	114	114	114
60	80	80	80	80	80
65	58	58	58	58	58
70	43	43	43	43	43
75	22	22	22	22	22
80	15	15	15	15	15
85	5	5	5	5	5
90	3	3	3	3	3

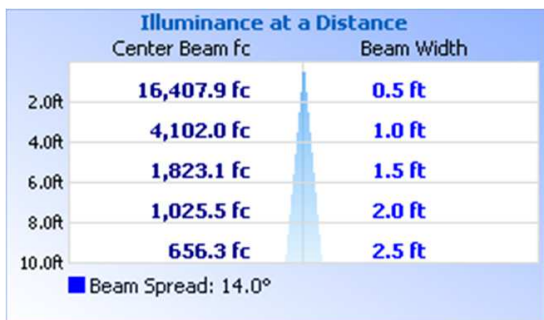


## RESULTS OF TEST (cont'd)

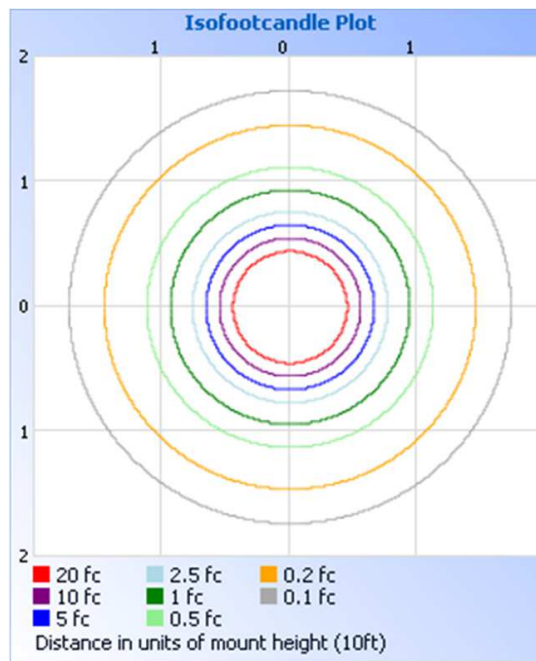
### Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	7516	90.1
0-40	7969	95.6
0-60	8248	98.9
60-90	91.6	1.1
0-90	8339	100.0
90-180	0.4	0.0
0-180	8340	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	3394	40.7
10-20	2988	35.8
20-30	1135	13.6
30-40	453.3	5.4
40-50	176.2	2.1
50-60	101.9	1.2
60-70	59.1	0.7
70-80	25.9	0.3
80-90	6.5	0.1
90-100	0.4	0.0

PICTURE (not to scale)



CONCLUSION

The results tabulated in this report are representative of the actual test samples submitted for this report only. The data is provided to the client for further evaluation. Compliance to the referenced specification requirements was not determined in this report.

In Charge Of Tests:



Ameet Alawi  
Technician  
Lighting Division

Attachment: None

Report Reviewed By:



Kenda Branch  
Lighting Performance Team Lead  
Lighting Division