REPORT

25800 COMMERCENTRE DRIVE, LAKE FOREST, CA 92630

Project No. G102328456 Date: April 2, 2016

REPORT NO. 102328456LAX-043

TEST OF ONE LED CHORUS

MODEL NO. DW CHORUS 48 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 48 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-1603210811-002.

DATES OF TESTS: March 30, 2016

SUMMARY

Model No.:	DW CHORUS 48 WW
Description:	LED CHORUS

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	8982	9208
Total Power (W)	244.0	242.1
Luminaire Efficacy (LPW)	36.81	38.03

Criteria	Result
Power Factor	0.977
Current ATHD %	18.72
Correlated Color Temperature (CCT - K)	2689
Color Rendering Index (CRI - Ra)	81.5
Color Rendering Index (CRI - R9)	12.9
DUV	0.001
Chromaticity Coordinate (x)	0.460
Chromaticity Coordinate (y)	0.409
Chromaticity Coordinate (u')	0.263
Chromaticity Coordinate (v')	0.527

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

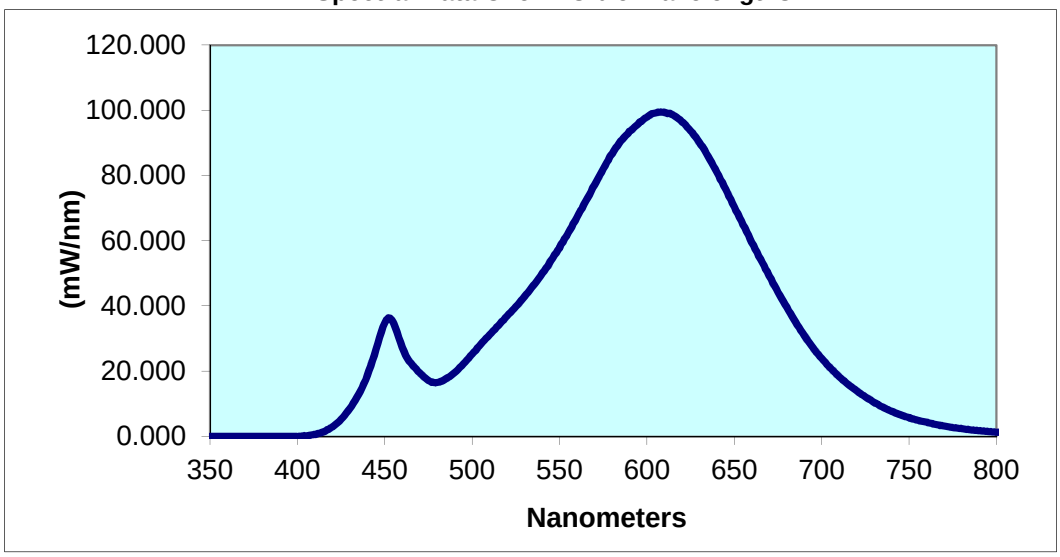
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
LAN-1603210811-002	UP	120.1	2080	244.0	0.9774	18.72	8982	36.81

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')
2689	81.5	12.9	0.001	0.460	0.409	0.263	0.527

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.023	440	18.730	530	43.000	620	96.490	710	18.380
355	0.023	445	26.660	535	46.310	625	93.760	715	16.020
360	0.023	450	34.960	540	49.980	630	90.130	720	14.000
365	0.023	455	34.850	545	53.870	635	85.900	725	12.140
370	0.023	460	27.420	550	57.950	640	81.100	730	10.410
375	0.023	465	22.450	555	62.500	645	75.740	735	9.034
380	0.023	470	19.570	560	67.240	650	70.370	740	7.733
385	0.023	475	17.160	565	72.200	655	64.990	745	6.701
390	0.023	480	16.620	570	77.180	660	59.610	750	5.788
395	0.023	485	17.720	575	82.030	665	54.400	755	5.026
400	0.024	490	19.660	580	86.640	670	49.290	760	4.381
405	0.235	495	22.290	585	90.650	675	44.290	765	3.728
410	0.607	500	25.290	590	93.600	680	39.610	770	3.196
415	1.477	505	28.370	595	95.830	685	35.100	775	2.757
420	2.956	510	31.210	600	97.970	690	30.970	780	2.454
425	5.328	515	34.050	605	99.270	695	27.200		
430	8.562	520	36.980	610	99.430	700	23.930		
435	12.960	525	39.830	615	98.550	705	21.000		

Spectral Data Over Visible Wavelengths



RESULTS OF TEST (cont'd)

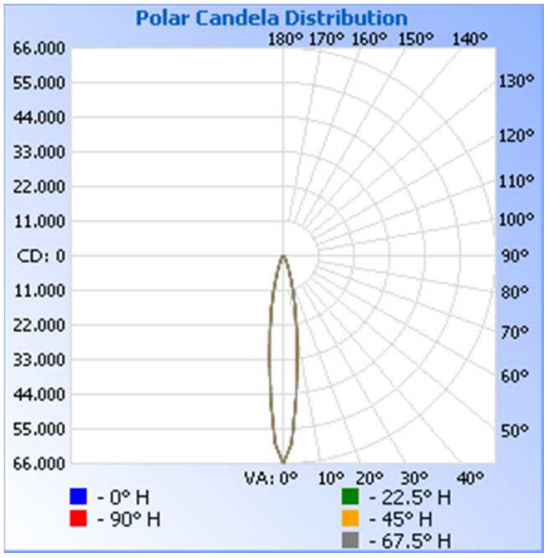
Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) – Distribution Method

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-1603210811-002	UP	120.0	2070	242.1	0.977	9208	38.03

Intensity (Candlepower) Summary at 25°C - Candelas

Maximum Candela Value: 65,944.3

Angle	0	22.5	45	67.5	90
0	65944	65944	65944	65944	65944
5	45399	45399	45399	45399	45399
10	23871	23871	23871	23871	23871
15	11845	11845	11845	11845	11845
20	5338	5338	5338	5338	5338
25	2694	2694	2694	2694	2694
30	1502	1502	1502	1502	1502
35	787	787	787	787	787
40	404	404	404	404	404
45	246	246	246	246	246
50	168	168	168	168	168
55	125	125	125	125	125
60	90	90	90	90	90
65	66	66	66	66	66
70	44	44	44	44	44
75	28	28	28	28	28
80	10	10	10	10	10
85	4	4	4	4	4
90	5	5	5	5	5

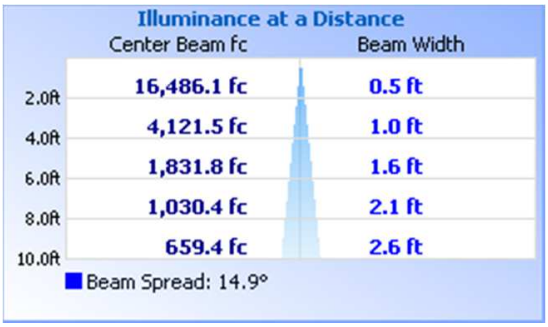


RESULTS OF TEST (cont'd)

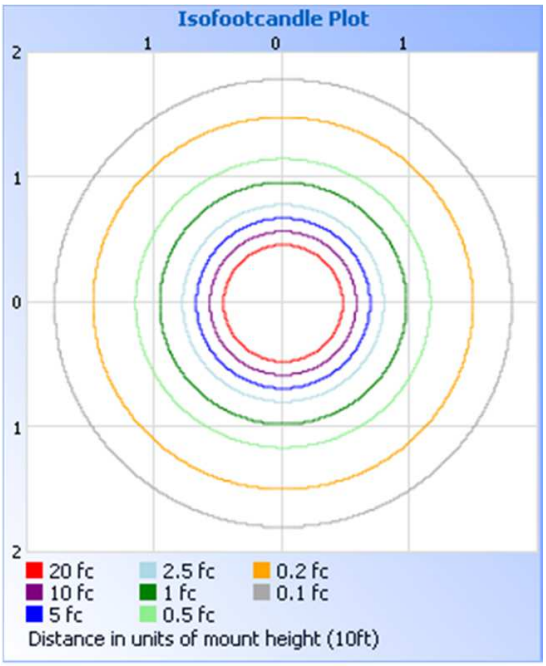
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	8275	89.9
0-40	8794	95.5
0-60	9105	98.9
60-90	102.3	1.1
0-90	9207	100.0
90-180	0.6	0.0
0-180	9208	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	3600	39.1
10-20	3359	36.5
20-30	1316	14.3
30-40	519.3	5.6
40-50	198.2	2.2
50-60	112.7	1.2
60-70	66.9	0.7
70-80	29.3	0.3
80-90	6.1	0.1
90-100	0.6	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
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Lighting Division

Report Reviewed By:

Kenda Branch
Lighting Performance Team Lead
Lighting Division

Attachment: None