



REPORT

545 E. Algonquin Rd., Arlington Heights, IL 60005

Project No. G101453556

Date: December 12, 2013

REPORT NO. 101453556CHI-001

TEST OF ONE TRIANT™ LED PUCK LIGHT

MODEL NO. DI-0332-**

RENDERED TO

ELEMENTAL LED, INC. DBA DIODE LED
1195 PARK AVENUE STE. 211
EMERYVILLE, CA 94706

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 NVLAP, NIST, or any agency of the federal government.

AUTHORIZATION: The testing performed was authorized by signed quote number 500493412.

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

ANSI NEMA ANSLG C78.377: 2012: Specifications of the Chromaticity of Solid State Lighting Products

DESCRIPTION OF SAMPLE: The client submitted one production sample of model number DI-0332-**. The sample was received by Intertek on December 5, 2013, in undamaged condition and one sample was tested as received. The sample designation was 12052013030546.

DATES OF TESTS: December 11, 2013 through December 12, 2013.



SUMMARY

Model No.:	DI-0332-**
Description:	TRIAN™ LED Puck Light

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	264.0	275.8
Total Power (W)	4.050	4.103
Luminaire Efficacy (LPW)	65.19	67.22

Criteria	Result
Power Factor	1.000
Current ATHD %	0.01
Correlated Color Temperature (CCT - K)	3042
Color Rendering Index (CRI - Ra)	82.0
Color Rendering Index (CRI - R9)	9.7
DUV	0.002
Chromaticity Coordinate (x)	0.436
Chromaticity Coordinate (y)	0.408
Chromaticity Coordinate (u')	0.248
Chromaticity Coordinate (v')	0.523

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date
Labsphere 2M Sphere & Spectroradiometer	CDS1100	146137	VBU	VBU
Elgar AC Power Supply	CW1251M	146113	VBU	VBU
Sorenson DC Power Supply	XFR150-8	146847	VBU	VBU
Yokogawa Power Analyzer	WT1600	146767	05/18/13	05/18/14
Omega Temperature	MDSi8	146873	08/26/13	08/26/14
Newport Thermohygrometer	iTHX-M	146382	08/26/13	08/26/14
Yokogawa Power Meter	WT210	146919	09/06/13	09/06/14
Omega Thermometer	DPI8-C24	146920	08/26/13	08/26/14
LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU
Newport Hygrometer	iServer	146960	02/21/13	02/21/14
Elgar, AC Power Supply	CW1251P	146918	VBU	VBU
Cole-Parmer Triple Timer	94440-00	CHI0041	06/20/13	06/20/14



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 Model CDS 1100 CCD Array Spectroradiometer and Two 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 Xitron or Yokogawa Power Analyzer.

The calibration of the sphere photometer-spectroradiometer 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 Xitron or 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

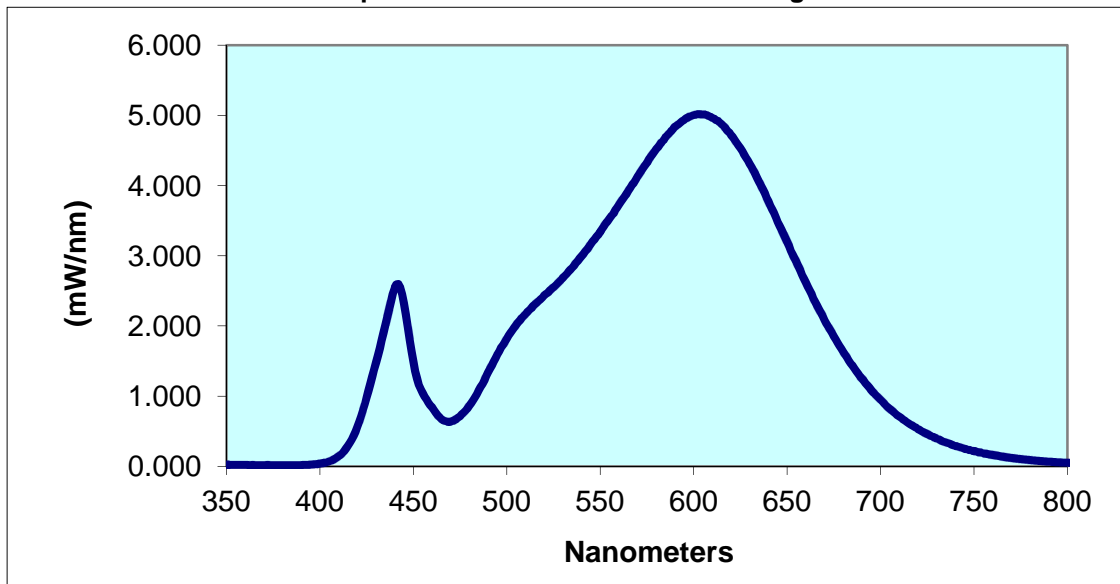
Intertek Sample No.	Base Orientation	Input Voltage {Vdc}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
12052013030546	UP	12.0	336.9	4.050	1.000	0.01	264.0	65.19

Correlated Color Temperature (K)	CRI -Ra	CRI -R9	DUV	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
3042	82.0	9.7	0.002	0.436	0.408	0.248	0.523

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.02	440	2.543	530	2.686	620	4.724	710	0.708
355	0.019	445	2.323	535	2.829	625	4.535	715	0.612
360	0.018	450	1.485	540	2.993	630	4.309	720	0.53
365	0.016	455	1.04	545	3.165	635	4.053	725	0.457
370	0.016	460	0.839	550	3.344	640	3.78	730	0.394
375	0.017	465	0.674	555	3.532	645	3.483	735	0.339
380	0.016	470	0.635	560	3.726	650	3.193	740	0.29
385	0.015	475	0.714	565	3.926	655	2.906	745	0.249
390	0.016	480	0.864	570	4.132	660	2.618	750	0.214
395	0.023	485	1.077	575	4.324	665	2.346	755	0.186
400	0.036	490	1.333	580	4.521	670	2.085	760	0.159
405	0.069	495	1.592	585	4.696	675	1.85	765	0.137
410	0.142	500	1.823	590	4.839	680	1.631	770	0.118
415	0.289	505	2.011	595	4.938	685	1.433	775	0.101
420	0.559	510	2.168	600	5.004	690	1.251	780	0.087
425	0.981	515	2.307	605	5.017	695	1.087		
430	1.479	520	2.433	610	4.966	700	0.945		
435	2.011	525	2.55	615	4.878	705	0.818		

Spectral Data Over Visible Wavelengths



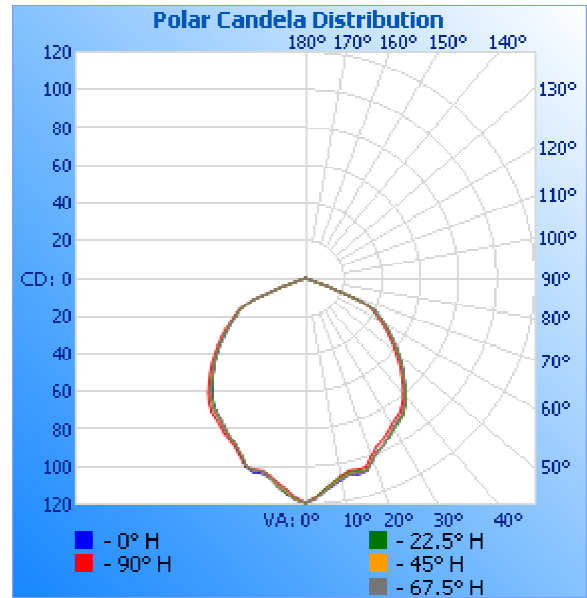
RESULTS OF TEST (cont'd)

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

Intertek Sample No.	Base Orientation	Input Voltage {Vdc}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
12052013030546	UP	12.0	342.0	4.103	1.000	275.8	67.22

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	119	119	119	119	119
5	113	112	113	113	112
10	108	107	108	108	106
15	108	106	107	107	105
20	103	102	102	103	100
25	97	97	97	97	95
30	92	92	92	92	90
35	88	89	88	88	86
40	81	82	81	81	79
45	72	72	72	72	70
50	64	64	64	63	62
55	56	56	55	55	53
60	47	47	47	46	45
65	40	40	39	38	38
70	12	12	12	12	12
75	0	0	0	0	0
80	0	0	0	0	0
85	0	0	0	0	0
90	0	0	0	0	0

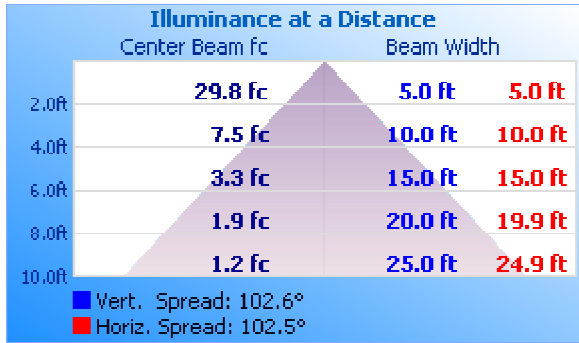


RESULTS OF TEST (cont'd)

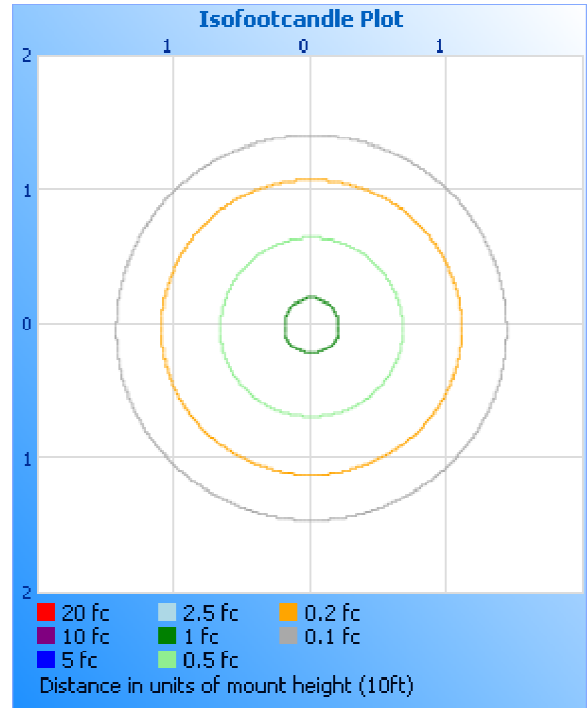
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	84.2	30.5
0-40	137.6	49.9
0-60	239.7	86.9
60-90	36.1	13.1
0-90	275.8	100.0
90-180	0.0	0.0
0-180	275.8	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	10.6	3.9
10-20	29.8	10.8
20-30	43.8	15.9
30-40	53.4	19.4
40-50	54.2	19.7
50-60	47.9	17.4
60-70	34.1	12.4
70-80	2.0	0.7
80-90	0.1	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:



Kenneth Prettyman
Technician
Lighting Division

Attachment: None

Report Reviewed By:



Joe Schledorn
Project Engineer
Lighting Division