



REPORT

Dialight, 1501 Route 34 South, Farmingdale, NJ 07727

Project No. G101464624CRT-001

Date: January 17, 2104

INTERTEK REPORT NO. G101464624CRT-001
DIALIGHT REPORT NO. L13029

TEST OF ONE LSA ATEX ZONE LINEAR - 4 FOOT

MODEL NO. LSA3C4M2F
DRIVER MODEL NO. INTEGRATED DIALIGHT DRIVER
LED MODEL NO. CREE XTE

RENDERED TO

DIALIGHT COPORATION
1501 ROUTE 34 SOUTH
FARMINDALE, NJ 07727

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 500500516.

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

Energy Star Version 1.2 (2012): Program Requirements for Luminaires (Light Fixtures)

Energy Star Manufacturer's Guide Version 2.1 (2010): Guide for Qualifying Solid State Lighting Luminaires

DESCRIPTION OF SAMPLE: The client submitted one production sample of model number LSA3C4M2F. The sample was received by Intertek on December 13, 2013, in undamaged condition and one sample was tested as received. The sample designation was L13029.

DATES OF TESTS: December 13, 2013 through December 18, 2013.

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SUMMARY

Model No.:	LSA3C4M2F
Description:	LSA ATEX Zone Linear - 4 foot

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	4651	4702
Total Power (W)	67.21	67.13
Luminaire Efficacy (LPW)	69.2	70.04

Criteria	Result
Power Factor at 120Vac	0.989
Power Factor at 277Vac	0.933
Current ATHD % at 120Vac	12.67
Current ATHD % at 277Vac	14.27
Correlated Color Temperature (CCT - K)	6850
Color Rendering Index (CRI - Ra)	73.3
Color Rendering Index (CRI - R9)	-24.1
DUV	0.005
Chromaticity Coordinate (x)	0.311
Chromaticity Coordinate (y)	0.332
Chromaticity Coordinate (u')	0.196
Chromaticity Coordinate (v')	0.469
Maximum In-Situ Source Temperature Point (°C)	51.7

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date
Elgar AC Power Supply	CW1251P	OP-014	VBU	VBU
Instrument System Spectrometer	CAS140B-151	OB-006	VBU	VBU
Sorensen DC Power Supply	XHR150-7	OP-016	VBU	VBU
Delta Elektronika DC Power Supply	SM300-5	OP-013	VBU	VBU
Volttech Universal Breakout Box	PM1000+	OP-012	03/06/13	03/06/14
Instrument System Lamps (Osram Sylvar	STD-20WF-3	OP-007	10/22/13	10/22/14
Instrument System Sphere	ISP1500	OP-010	VBU	VBU
Digital Thermometer 342	TPI 343	OP-011	03/06/13	03/06/14
Instek AC Power Supply	APS-9501	N/A	VBU	VBU
Volttech Power Analyzer	PM1000+	OP-012	02/27/13	02/27/14
Extech Hygro-Thermometer	445703	OP-017	06/01/13	06/01/14
LSI High Speed Mirror Goniometer	6240T	N/A	VBU	VBU
Elgar AC Power Supply	CW1251P	N/A	VBU	VBU
Yokogawa Power Analyzer	760401	OP-004	03/06/13	03/06/14
Omega TC	Dpi8	OP-001	03/06/13	03/06/14
Extech Hygro-Thermometer	445703	OP-018	04/22/13	04/22/14
Fluke 8808A Digital Multimeter	8808A	OP-002	03/06/13	03/06/14
Extech Hygro-Thermometer	445703	OP-017	06/01/13	06/01/14
Fluke Multimeter	PM2525	M127	11/01/13	11/01/14
Digital Thermometer 342	TPI 343	OP-011	03/06/13	03/06/14



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 Instrument System CAS 140B Array Spectroradiometer and 1.5 or Five Foot 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 Volttech 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 6240T 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.

In-Situ Maximum Measured Power Supply Case and LED Source Point Temperature

Power supply case and/or LED source operating temperature measurements were taken on one test sample per model with a thermocouple and Fluke 87 temperature meter. The SSL sample was allowed to reach thermal equilibrium for seven and a half hours before measurements were taken. Power supply or source temperature measurements were measured at the TMPPS or TS point as indicated by the included diagram in accordance with manufacturers declared hot spot location, or at a hot spot location found with a thermal camera when no diagram from the manufacturer is given. The maximum temperature was recorded for the sample. A simulated ceiling or other enclosure may be used in accordance to UL 1598 or UL 153 as applicable.

RESULTS OF TEST

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

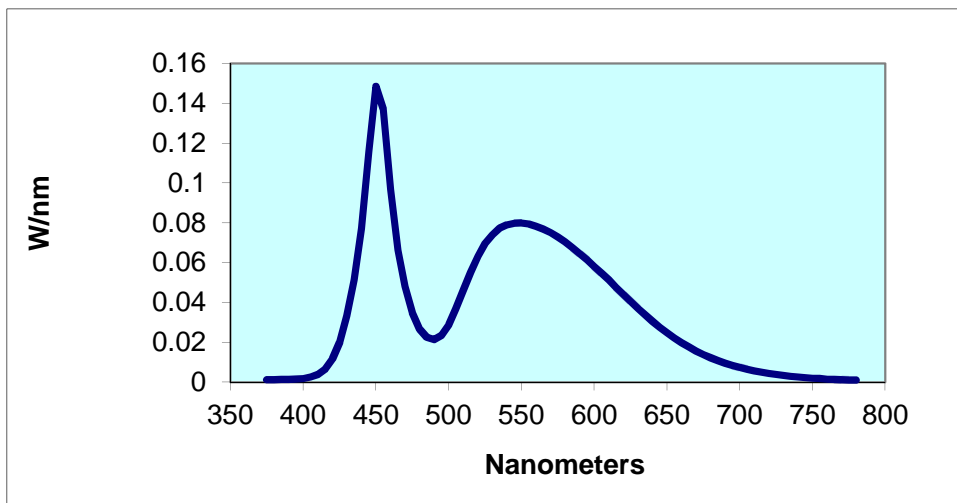
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
L13029	UP	120.0	0.511	67.21	0.989	12.67	4651	69.2

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')
6850	73.3	-24.1	0.005	0.311	0.332	0.196	0.469

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
375	0.001	465	0.0662	555	0.0794	645	0.0276	735	0.00295
380	0.001	470	0.0481	560	0.0784	650	0.0248	740	0.01456
385	0.001	475	0.0349	565	0.0769	655	0.0222	745	0.01456
390	0.001	480	0.0265	570	0.0751	660	0.0198	750	0.01456
395	0.001	485	0.0224	575	0.0729	665	0.0176	755	0.01456
400	0.002	490	0.0214	580	0.0704	670	0.0156	760	0.01456
405	0.003	495	0.0235	585	0.0675	675	0.0138	765	0.01456
410	0.004	500	0.0289	590	0.0646	680	0.0122	770	0.01456
415	0.007	505	0.0368	595	0.0614	685	0.0108	775	0.01456
420	0.012	510	0.0461	600	0.0581	690	0.0095	780	0.01456
425	0.02	515	0.0552	605	0.0548	695	0.0084		
430	0.033	520	0.0632	610	0.0512	700	0.0074		
435	0.051	525	0.0696	615	0.0476	705	0.0065		
440	0.077	530	0.074	620	0.044	710	0.0057		
445	0.116	535	0.0773	625	0.0405	715	0.005		
450	0.149	540	0.079	630	0.037	720	0.0044		
455	0.137	545	0.0798	635	0.0337	725	0.0039		
460	0.097	550	0.0799	640	0.0306	730	0.0034		

Spectral Data Over Visible Wavelengths



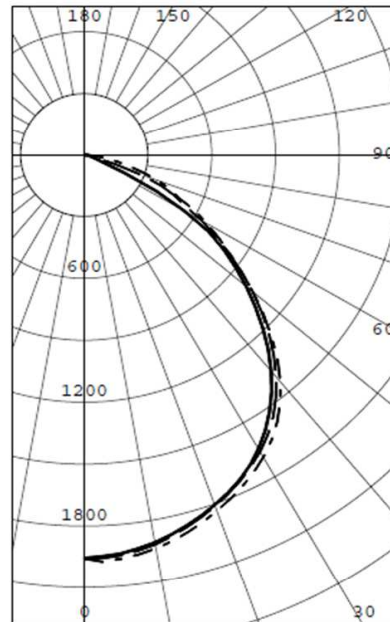
RESULTS OF TEST (cont'd)

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

Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (A)	Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
L13029	UP	120.0	0.576	67.13	0.992	4702	70.04

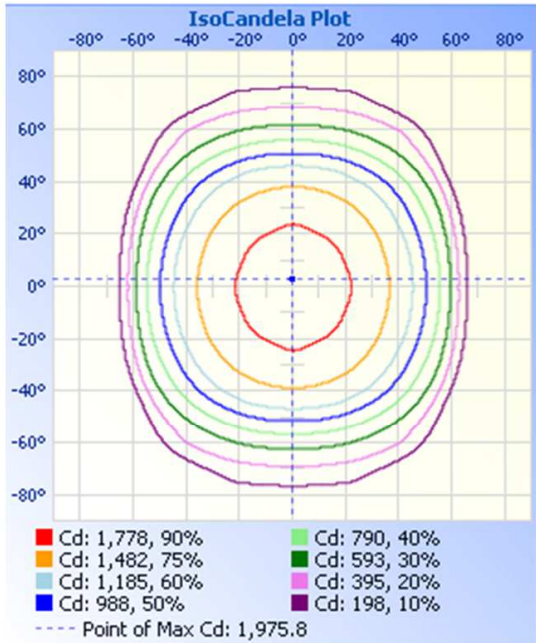
Intensity (Candlepower) Summary at 25°C - Candelas

INTENSITY (CANDLEPOWER) SUMMARY						OUTPUT LUMENS
ANGLE	ALONG	22.5	45	67.5	ACROSS	
0	1957	1957	1957	1957	1957	
5	1968	1936	1950	1936	1942	187
15	1892	1864	1869	1858	1862	526
25	1768	1745	1741	1726	1735	801
35	1581	1564	1551	1519	1519	962
45	1246	1248	1229	1187	1187	936
55	838	845	829	804	798	735
65	485	480	467	309	205	407
75	228	221	59	35	32	131
85	31	10	8	7	7	17
90	0	0	0	0	0	
95	0	0	0	0	0	0
105	0	0	0	0	0	0
115	0	0	0	0	0	0
125	0	0	0	0	0	0
135	0	0	0	0	0	0
145	0	0	0	0	0	0
155	0	0	0	0	0	0
165	0	0	0	0	0	0
175	0	0	0	1	1	0
180	0	0	0	0	0	



RESULTS OF TEST (cont'd)

Isoillumination Plots



Zonal Lumen Summary and Percentages at 25°C

ZONAL LUMENS AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	1515	32.21
0-40	2476	52.67
0-60	4148	88.21
0-90	4702	100.00
40-90	2226	47.33
60-90	554	11.79
90-180	0	0.00
0-180	4702	100.00

RESULTS OF TEST (cont'd)

In-Situ Maximum Measured LED Source Temperature

Manufacturer Supplied Documentation:

LED identified as CREE XTE

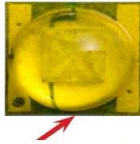


PRODUCT CHARACTERISTICS

Characteristics	Unit	Minimum	Typical	Maximum
Thermal resistance, junction to solder point	°C/W		5	
Viewing angle (FWHM) - white	degrees		115	
Viewing angle (FWHM) - royal blue	degrees		140	
Temperature coefficient of voltage	mV/°C		-2.5	
ESD classification (HEM per Mil-Std-883D)			Class 2	
DC forward current	mA			1500
Reverse voltage	V			5
Forward voltage (@ 350 mA, 85 °C)	V		2.85	3.4
LED junction temperature	°C			150

CASE TEMPERATURE (T_s) MEASUREMENT POINT

XLamp XT Family LED case temperature (T_s) should be measured on the PCB surface, as close to the LED's thermal pad as possible. This measurement point is shown in the picture below.

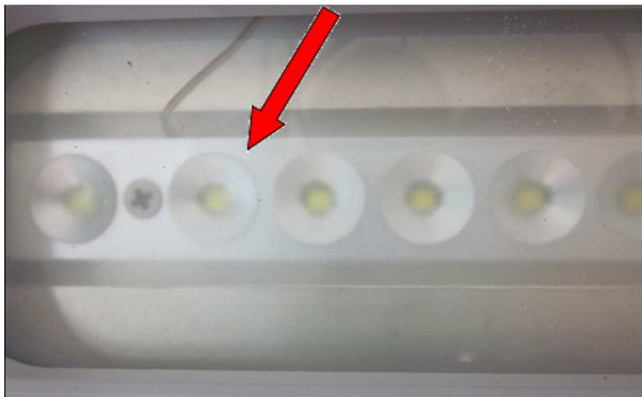


Maximum Junction Temperature from LED specification (T_J) = 150°
 Thermal Resistance Formula from LED specification = 5°C/W
 Maximum Forward Voltage (V_f) from LED specification = 3.4V
 Measured LED Current = 305mA
 Calculated LED Wattage = V_f x Measured LED Current = 1.037W
 Maximum Source Temperature (T_s) = T_J - (LED Wattage x Thermal Resistance) = 144.8°C

Maximum Measured Manufacturer Designated Source Temperature

Sample No.	Maximum Measured Source Temperature (°C)	Location	Maximum Rated Source Temperature (°C)
L13029	51.7	Per diagram	144.8

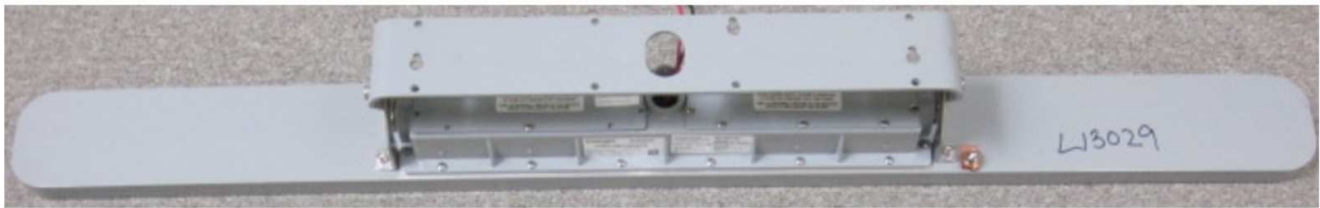
In-Situ Picture – T_s



In-Situ Picture – T_s location



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:

Report Reviewed By:

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Lighting Division

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Dialight Corporation
Engineering Manager
Lighting Division

Attachment: None

Report Reviewed By:

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Photometricks - Intertek