

REPORT

25800 COMMERCE DRIVE, LAKE FOREST, CA 92630

Project No. G103924656

Date: May 10, 2019

REPORT NO. 103924656LAX-002

TEST OF ONE LED LUMINAIRE

MODEL NO. ALD-R-160W-LV-30K-T4
LED MODEL NO. GWP9LR34.PM-M2M3
DRIVER MODEL NO. EUD-150S350DTA
RETROFIT MODEL NO. LITHONIA KAD CONTOUR SERIES

RENDERED TO

SIMPLYLEDs LLC
111 W. 34TH STREET
GARDEN CITY, IDAHO, 83714

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

AUTHORIZATION: The testing performed was authorized by signed quote number Qu-00973316-1.

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: 2015: Specifications of the Chromaticity of Solid State Lighting Products

UL 1598-2009: Underwriters Laboratories Inc. Standard for Safety - Luminaires

DESCRIPTION OF SAMPLE: The client submitted one production sample of model number ALD-R-160W-LV-30K-T4. The sample was received by Intertek on March 19, 2019, in undamaged condition and one sample was tested as received. The sample designation was LAN1903191345-003A.

DATES OF TESTS: May 1, 2019 through May 8, 2019.

SUMMARY

Model No.: ALD-R-160W-LV-30K-T4

Description: LED Luminaire

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	19205	18865
Total Power (W)	156.3	156.5
Luminaire Efficacy (LPW)	122.9	120.5

Criteria	Result
Power Factor at 120Vac	0.997
Power Factor at 277Vac	0.968
Current ATHD % at 120Vac	6.52
Current ATHD % at 277Vac	7.22
Correlated Color Temperature (CCT - K)	3072
Color Rendering Index (CRI - Ra)	71.2
Color Rendering Index (CRI - R9)	-40.1
DUV	0.000
Chromaticity Coordinate (x)	0.432
Chromaticity Coordinate (y)	0.402
Chromaticity Coordinate (u')	0.248
Chromaticity Coordinate (v')	0.520
BUG Rating	B3-U0-G3
IES Classification	Type IV
Longitudinal Classification	Very Short
Maximum In-Situ Source Temperature Point (°C)	70.5
Maximum In-Situ Driver Case Temperature (°C)	76.6

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date	Date Used
Goniophotometer	6440T	000943	VBU	VBU	05/01/19
AC Source	CW1251P	000944	VBU	VBU	05/01/19
Power Analyzer	WT210	000945	11/28/18	11/28/19	05/01/19
Magnetic Level	581-9	001610	10/31/18	10/31/19	05/01/19
Thermometer	DPi8-C24	001782	09/21/18	09/21/19	05/01/19
3m Sphere	CSTM-LMS-3M-3020	000830	VBU	VBU	05/02/19
Spectrometer	CDS-3020-T	000834	VBU	VBU	05/02/19
Power Supply (AC 3P / DC)	CSW5550-208-LAN	001339	VBU	VBU	05/02/19
Power Meter	WT330	001319	08/13/18	08/13/19	05/02/19
DC Power Supply	LPS-100-0833	000832	01/31/19	01/31/20	05/02/19
Network TC Reader	iSD-TC	000824	02/01/19	02/01/20	05/02/19
Temp. & RH Meter	971	001177	01/29/19	01/29/20	05/08/19
AC Source	CW1251P-V	001336	VBU	VBU	05/08/19
Power Meter	WT333-D-C1/EX2/G5	001322	11/28/18	11/28/19	05/08/19
Thermometer	52 Series II	001265	10/04/18	10/04/19	05/08/19

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-3020 High Sensitivity Multi Channel Spectrometer and Two Meter or 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 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.

BUG Ratings (Backlight, Uplight, Glare) – for Outdoor Fixtures Only

Zonal Lumens were calculated and grouped using the formula in IESNA TM-15-11 for each zone as defined in the BUG addendum. The maximum lumen rating in each zone was compared against the BUG zonal requirements of Energy Star. Photometric Toolbox software was used to calculate results.

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

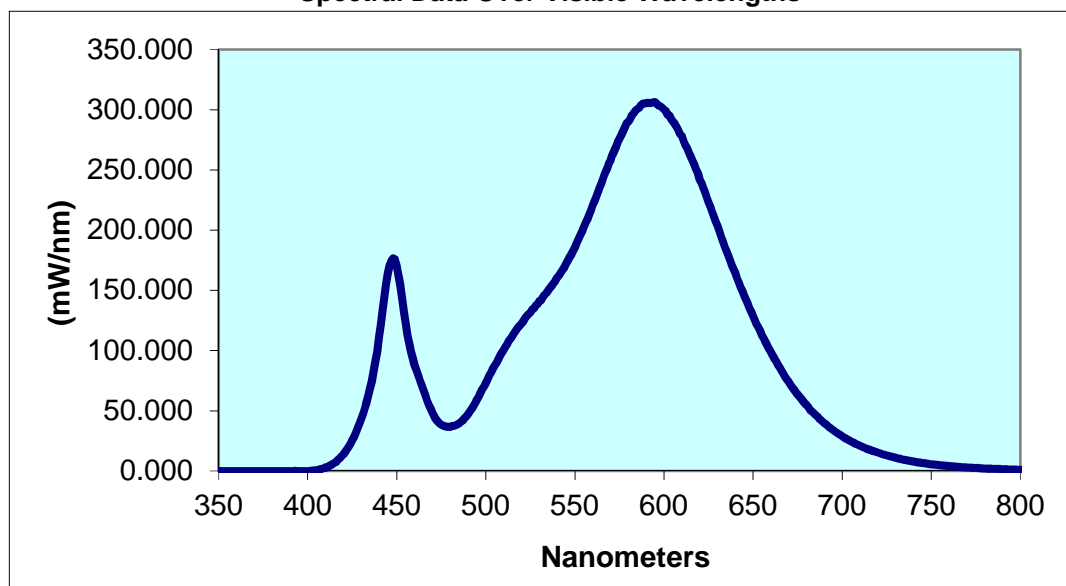
Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) - Integrating Sphere Method

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)
LAN1903191345-003A	UP	120.1 277.0	1306 566.3	156.3 151.9	0.997 0.968	6.52 7.22	19205	122.9
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')	
3072	71.2	-40.1	0.000	0.432	0.402	0.248	0.520	

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.135	440	110.7	530	141.0	620	242.3	710	20.98
355	0.000	445	164.5	535	149.8	625	223.1	715	17.71
360	0.000	450	170.6	540	160.3	630	203.6	720	15.31
365	0.000	455	122.2	545	171.8	635	182.8	725	12.97
370	0.000	460	88.17	550	185.8	640	164.4	730	11.16
375	0.000	465	67.36	555	202.5	645	146.0	735	9.254
380	0.000	470	48.49	560	220.6	650	128.7	740	7.861
385	0.000	475	38.39	565	239.5	655	112.7	745	6.675
390	0.000	480	36.68	570	257.6	660	98.65	750	5.617
395	0.000	485	39.61	575	275.7	665	85.81	755	4.824
400	0.040	490	47.14	580	290.1	670	73.98	760	4.128
405	0.741	495	59.08	585	300.4	675	63.65	765	3.434
410	3.014	500	72.99	590	305.7	680	54.68	770	2.940
415	6.818	505	87.53	595	306.4	685	46.69	775	2.460
420	13.81	510	100.5	600	300.3	690	39.85	780	2.141
425	25.33	515	112.6	605	290.3	695	33.98		
430	42.73	520	122.4	610	278.2	700	28.83		
435	68.59	525	131.6	615	261.5	705	24.58		

Spectral Data Over Visible Wavelengths



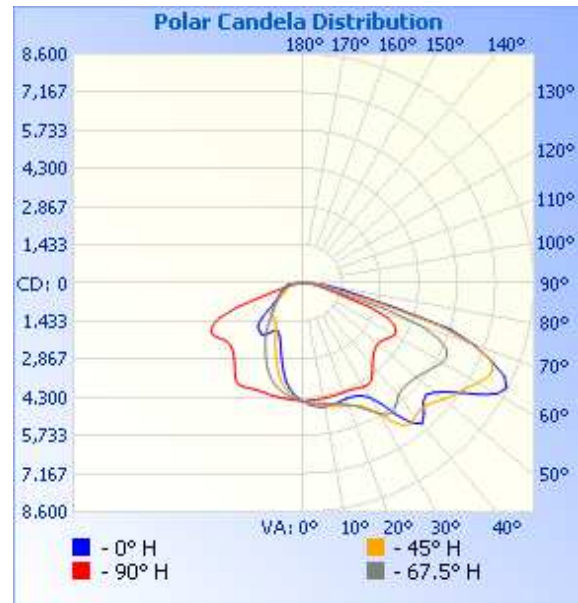
RESULTS OF TEST (cont'd)

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 (LPW)
LAN1903191345-003A	UP	120.0	1308	156.5	0.997	18865	120.5

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	25	45	67.5	90
0	4451	4451	4451	4451	4451
5	4630	4614	4590	4514	4400
10	4705	4703	4692	4591	4388
15	4682	4716	4786	4699	4377
20	4624	4707	4898	4868	4365
25	4681	4782	5102	5175	4396
30	4969	5130	5696	5660	4492
35	6024	6198	6550	5869	4427
40	6893	6552	6496	5508	4010
45	6314	6295	6491	5417	3707
50	6382	6559	6796	5500	3590
55	7180	7029	7118	5700	3687
60	8324	7796	7500	5967	3908
65	8284	7960	7801	5900	3736
70	6773	6107	6706	4695	2648
75	3468	2729	2963	1391	951
80	1517	1078	1045	751	556
85	741	545	631	432	225
90	0	0	0	0	0



RESULTS OF TEST (cont'd)

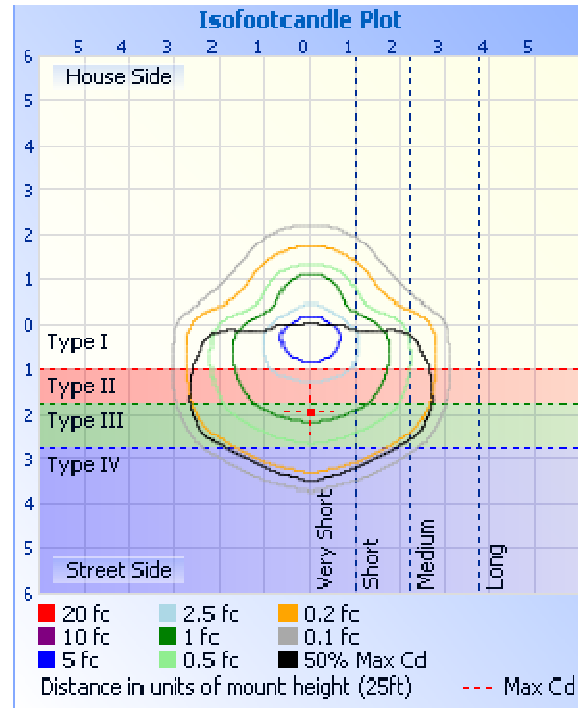
Illumination Plots

Mounting Height: 25 ft.

Illuminance - Cone of Light



Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	3389	18.0
0-40	5987	31.7
0-60	12658	67.1
60-90	6206	32.9
0-90	18865	100.0
90-180	0.0	0.0
0-180	18865	100.0

Luminaire Classification System (LCS)

LCS	Zone	Lumens	% Luminaire
FL	(0-30)	2036	10.8
FM	(30-60)	7015	37.2
FH	(60-80)	4766	25.3
FVH	(80-90)	286.0	1.5
BL	(0-30)	1354.0	7.2
BM	(30-60)	2254	11.9
BH	(60-80)	943.6	5.0
BVH	(80-90)	212.1	1.1
UL	(90-100)	0.0	0.0
UH	(100-180)	0.0	0.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	418.8	2.2
10-20	1171	6.2
20-30	1799	9.5
30-40	2598	13.8
40-50	3094	16.4
50-60	3577	19.0
60-70	3876	20.5
70-80	1833	9.7
80-90	498.0	2.6

BUG Rating: B3-U0-G3

IES Classification: Type IV

Longitudinal Classification: Very Short

RESULTS OF TEST (cont'd)

In-Situ Maximum Measured LED Source Temperature

Manufacturer Supplied Documentation:

Forward Voltage Groups 1) page 23
Durchlassspannungsgruppen 1) Seite 23

Group Gruppe	(min.) V_F [V]	(max.) V_F [V]
K8	20.80	21.60
T8	21.60	22.40
28	22.40	23.20

Maximum Ratings Grenzwerte

Parameter Bezeichnung	Symbol Symbol	Values Werte	Unit Einheit
Junction temperature Sperrschichttemperatur	T_j	125	°C

Parameter Bezeichnung	Symbol Symbol	Values Werte	Unit Einheit
"Electrical" thermal resistance junction / solder point (typ.) "Elektrischer" Wärmewiderstand Sperrschicht / Lötpad (with efficiency $\eta_e = 59\%$)	R_{thJSel}	1.5	K/W

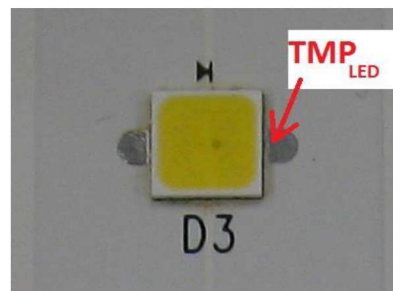


Fig. 2 DURIS S8 type LED model GW P9LT31.PM and temperature measurement point.

Maximum Junction Temperature from LED specification (T_j) = 125°C

Thermal Resistance Formula from LED specification = 1.5°C/W

Maximum Forward Voltage (V_f) from LED specification = 23.2V

Measured LED Current = 513.3mA

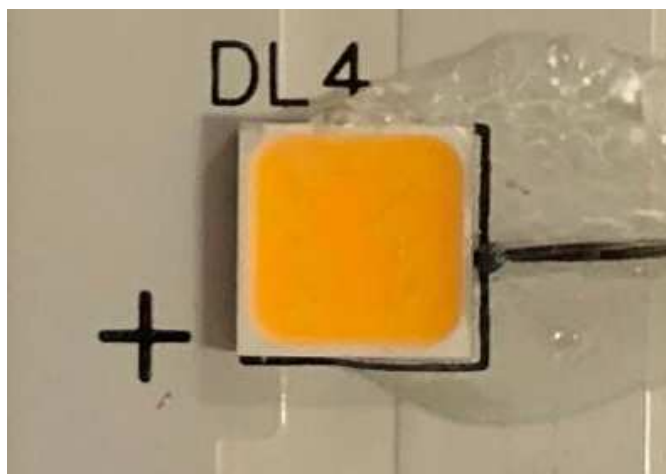
Calculated LED Wattage = $V_f \times$ Measured LED Current = 11.909W

Maximum Source Temperature (T_s) = $T_j - (\text{LED Wattage} \times \text{Thermal Resistance}) = 107.1^\circ\text{C}$

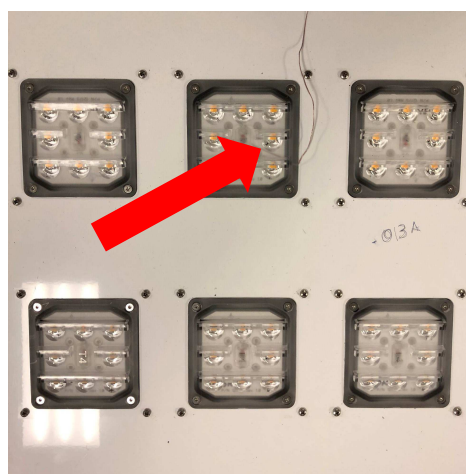
Maximum Measured Manufacturer Designated Source Temperature

Sample No.	Maximum Measured Source Temperature (°C)	Location	Maximum Rated Source Temperature (°C)
LAN1903191345-003A	70.5	Per specs above	107.1

LED In-Situ Picture – T_s



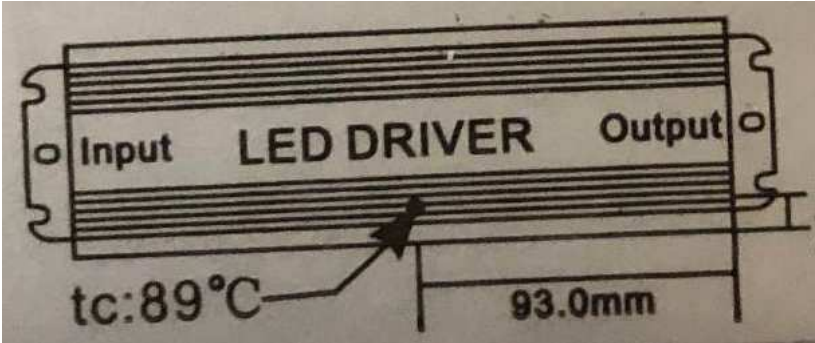
LED In-Situ Picture – T_s location



RESULTS OF TEST (cont'd)

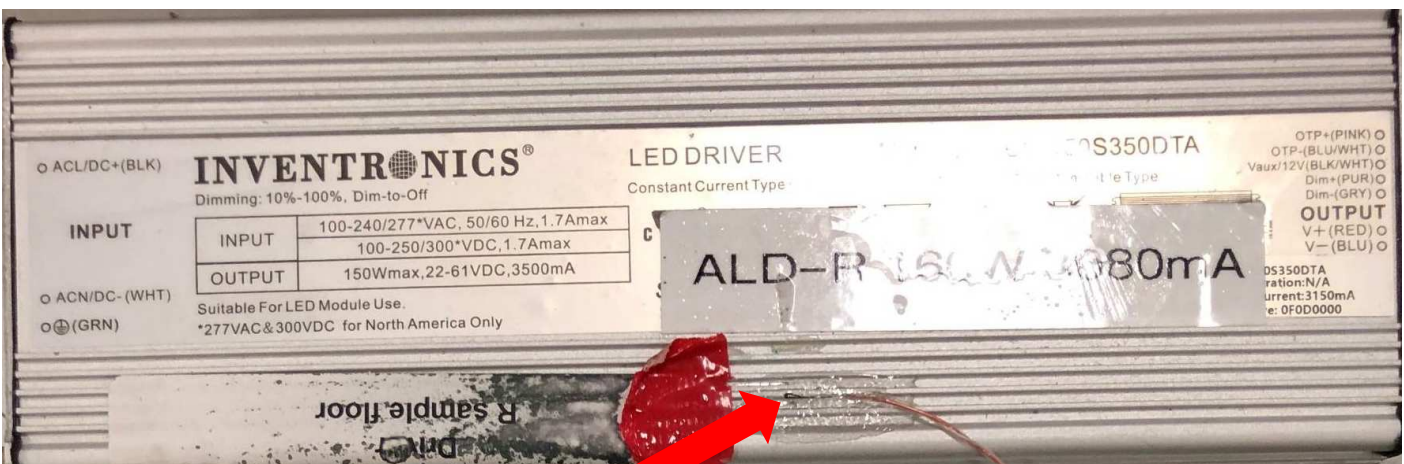
In-Situ Maximum Measured Power Supply Case Temperature

Manufacturer Supplied Documentation:

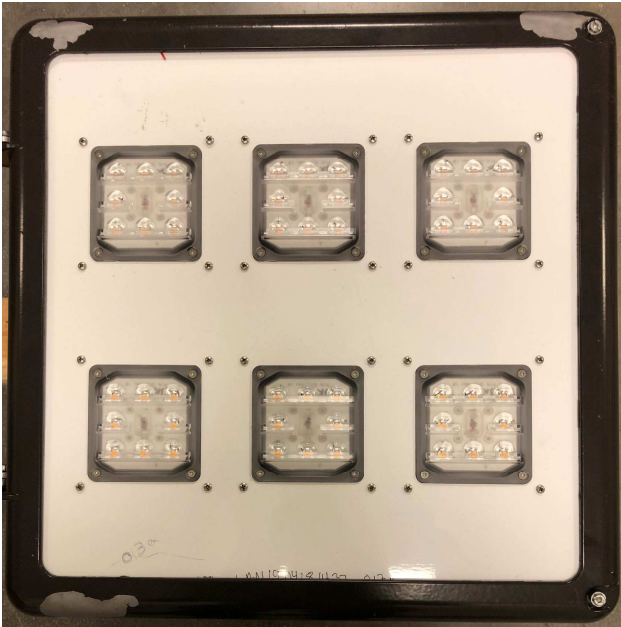


Sample No.	Maximum Measured Source Temperature (°C)	Location	Maximum Rated Source Temperature (°C)
LAN1903191345-003A	76.6	Per specs above	89.0

Driver In-Situ Picture – Ts Location



PICTURES (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:

A handwritten signature in black ink, appearing to read 'Erik Linares'.

Erik Linares
Associate Engineer
Lighting Division

Attachment: None

Report Reviewed By:

A handwritten signature in black ink, appearing to read 'Vladimir Kozak'.

Vladimir Kozak
Engineering Supervisor
Lighting Division