

## REPORT

25800 COMMERCE DRIVE, LAKE FOREST, CA 92630

Project No. G103924656

Date: May 17, 2019

REPORT NO. 103924656LAX-013

TEST OF ONE LED LUMINAIRE

MODEL NO. ALD-R-160W-HV-30K-T4  
LED MODEL NO. GWP9LR34.PM-M2M3  
DRIVER MODEL NO. ESD-150S350DT  
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-HV-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 11, 2019 through May 17, 2019.

## SUMMARY

Model No.: ALD-R-160W-HV-30K-T4  
Description: LED Luminaire

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	19835	19275
Total Power (W)	158.7	158.7
Luminaire Efficacy (LPW)	125.0	121.5

Criteria	Result
Power Factor at 277Vac	0.993
Power Factor at 480Vac	0.962
Current ATHD % at 277Vac	7.97
Current ATHD % at 480Vac	6.61
Correlated Color Temperature (CCT - K)	3075
Color Rendering Index (CRI - Ra)	71.2
Color Rendering Index (CRI - R9)	-40.0
DUV	0.000
Chromaticity Coordinate (x)	0.431
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)	65.2
Maximum In-Situ Driver Case Temperature (°C)	70.5

## EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date	Date Used
Goniophotometer	6440T	000943	VBV	VBV	05/11/19
Power Analyzer	WT210	000945	11/28/18	11/28/19	05/11/19
Magnetic Level	581-9	001610	10/31/18	10/31/19	05/11/19
Thermometer	DPI8-C24	001782	09/21/18	09/21/19	05/11/19
Temp. & RH Meter	971	001177	01/29/19	01/29/20	05/11/19
Power Supply (AC 3P / DC)	CSW5550-208-LAN	001339	VBV	VBV	05/11/19
3m Sphere	CSTM-LMS-3M-3020	000830	VBV	VBV	05/11/19
Spectrometer	CDS-3020-T	000834	VBV	VBV	05/11/19
Power Supply (AC 3P / DC)	CSW5550-208-LAN	001339	VBV	VBV	05/11/19
Power Meter	WT330	001319	08/13/18	08/13/19	05/11/19
Temp. & RH Meter	971	001177	01/29/19	01/29/20	05/11/19
DC Power Supply	LPS-100-0833	000832	01/31/19	01/31/20	05/11/19
Network TC Reader	iSD-TC	000824	02/01/19	02/01/20	05/11/19
Variac	2520CT-2	001095	VBV	VBV	05/11/19
Thermometer	DPI8-C24	001782	09/21/18	09/21/19	05/17/19
Temp. & RH Meter	971	001177	01/29/19	01/29/20	05/17/19
True RMS Multimeter	87	000029	09/27/18	09/27/19	05/17/19
AC Source	CW1251P-V	001334	VBV	VBV	05/17/19
Power Meter	WT330	001321	08/13/18	08/13/19	05/17/19

## 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

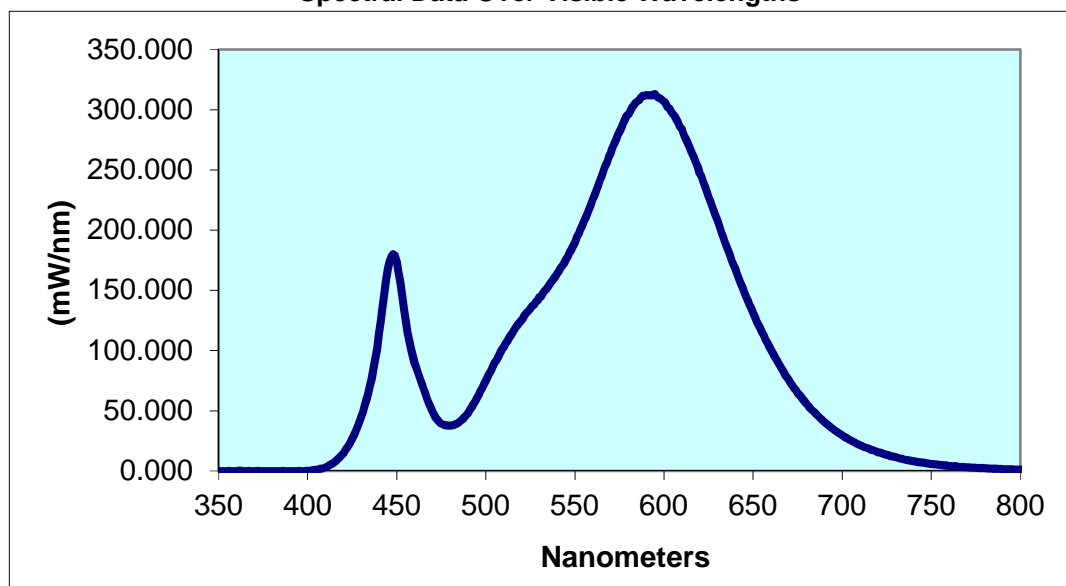
### Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) - Integrating Sphere Method

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	277.0	576.7	158.7	0.993	7.97	19835	125.0
		480.0	345.4	159.4	0.962	6.61		
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')	
3075	71.2	-40.0	0.000	0.431	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	0.000	440	114.0	530	144.1	620	247.3	710	21.44
355	0.000	445	167.9	535	153.1	625	227.8	715	18.40
360	0.000	450	173.9	540	163.8	630	208.2	720	15.68
365	0.000	455	124.8	545	175.8	635	186.7	725	13.43
370	0.000	460	90.06	550	190.0	640	167.8	730	11.60
375	0.000	465	68.82	555	207.0	645	149.1	735	9.572
380	0.000	470	49.67	560	225.5	650	131.4	740	8.110
385	0.000	475	39.30	565	244.8	655	115.2	745	7.173
390	0.000	480	37.62	570	263.4	660	100.9	750	5.881
395	0.215	485	40.71	575	281.9	665	87.68	755	5.000
400	0.172	490	48.34	580	296.2	670	75.57	760	4.260
405	1.014	495	60.47	585	306.8	675	65.15	765	3.704
410	3.162	500	74.90	590	312.1	680	55.71	770	3.096
415	7.363	505	89.66	595	312.9	685	47.79	775	2.675
420	14.66	510	102.6	600	307.0	690	40.74	780	2.350
425	26.86	515	115.0	605	296.3	695	34.80		
430	44.61	520	125.3	610	284.0	700	29.58		
435	71.00	525	134.5	615	266.8	705	25.34		

**Spectral Data Over Visible Wavelengths**



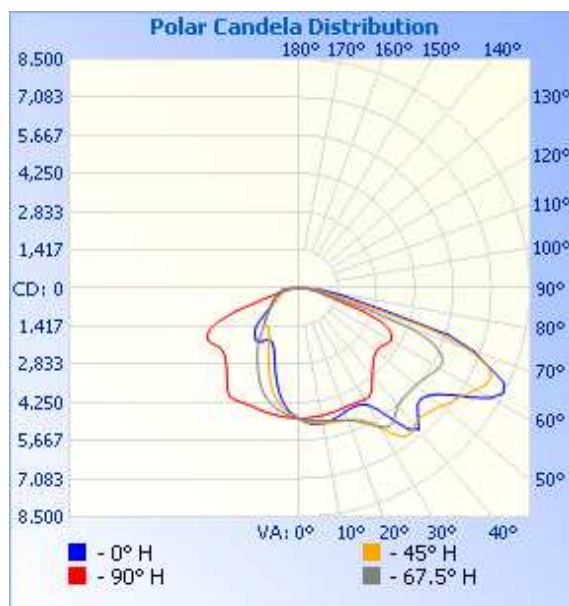
RESULTS OF TEST (cont'd)

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	277.0	576.8	158.7	0.993	19275	121.5

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	25	45	67.5	90
0	4859	4859	4859	4859	4859
5	5057	5044	5010	4931	4824
10	5093	5100	5092	4998	4802
15	5015	5064	5148	5082	4772
20	4893	4995	5221	5221	4735
25	4845	4993	5398	5505	4736
30	4993	5295	5985	5953	4788
35	5925	6265	6743	6044	4647
40	6851	6558	6616	5667	4176
45	6151	6309	6591	5572	3857
50	6204	6545	6812	5604	3684
55	6929	7022	7125	5740	3733
60	8145	7819	7524	5934	3893
65	8344	7956	7829	5773	3664
70	6835	5998	6616	4479	2497
75	3341	2534	2667	1361	995
80	1627	1043	1029	775	586
85	812	525	614	447	245
90	0	0	0	0	0



## RESULTS OF TEST (cont'd)

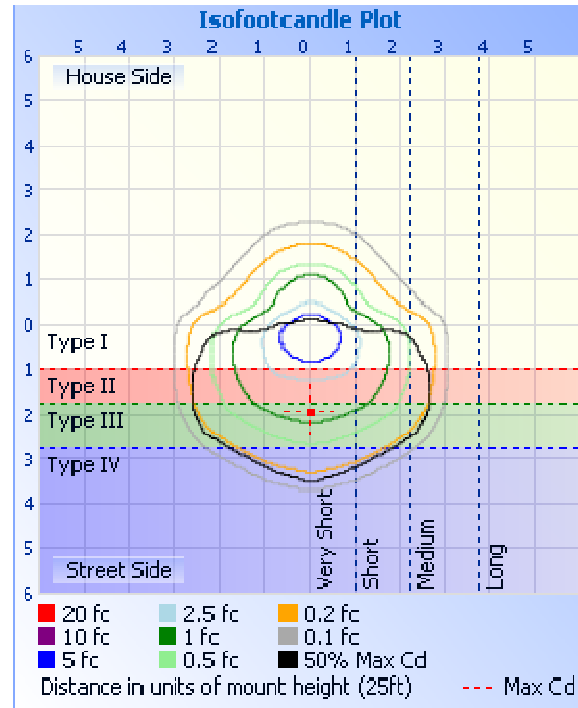
### Illumination Plots

Mounting Height: 25 ft.

Illuminance - Cone of Light



Isoillumination Plot



### Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	3639	18.9
0-40	6329	32.8
0-60	13065	67.8
60-90	6210	32.2
0-90	19275	100.0
90-180	0.0	0.0
0-180	19275	100.0

### Luminaire Classification System (LCS)

LCS	Zone	Lumens	% Luminaire
FL	(0-30)	2167	11.2
FM	(30-60)	7068	36.7
FH	(60-80)	4697	24.4
FVH	(80-90)	287.3	1.5
BL	(0-30)	1473.1	7.6
BM	(30-60)	2358	12.2
BH	(60-80)	1001.0	5.2
BVH	(80-90)	226.0	1.2
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	456.5	2.4
10-20	1268	6.6
20-30	1915	9.9
30-40	2689	14.0
40-50	3143	16.3
50-60	3594	18.6
60-70	3880	20.1
70-80	1816	9.4
80-90	513.3	2.7

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 <sup>1) page 43</sup>  
Durchlassspannungsgruppen <sup>1) Seite 23</sup>

Group Gruppe	(min.) V <sub>F</sub> [V]	(max.) V <sub>F</sub> [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 <sub>j</sub>	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 <sub>th JS el</sub>	1.5	K/W

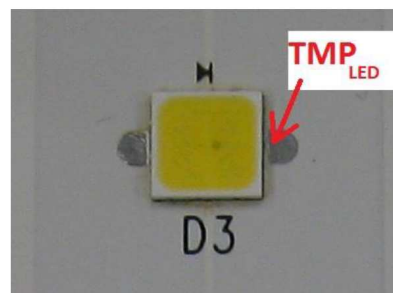


Fig. 2 DURIS S8 type LED model GW P9LT31.PM and temperature measurement point.

Maximum Junction Temperature from LED specification (T<sub>j</sub>) = 125°C

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

Maximum Forward Voltage (V<sub>f</sub>) from LED specification = 23.2V

Measured LED Current = 521.5mA

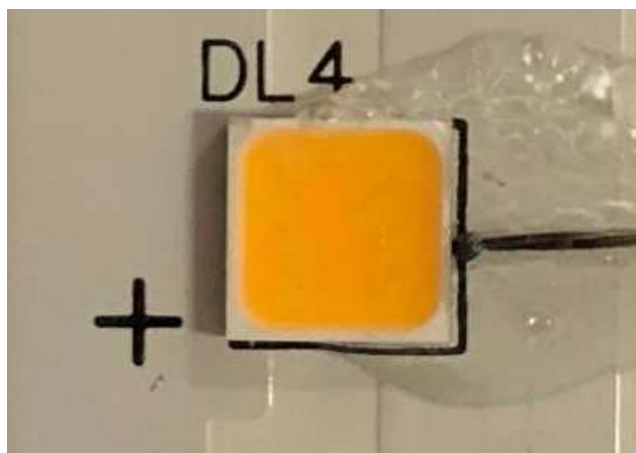
Calculated LED Wattage = V<sub>f</sub> x Measured LED Current = 12.099W

Maximum Source Temperature (T<sub>s</sub>) = T<sub>j</sub> – (LED Wattage x Thermal Resistance) = 106.9°C

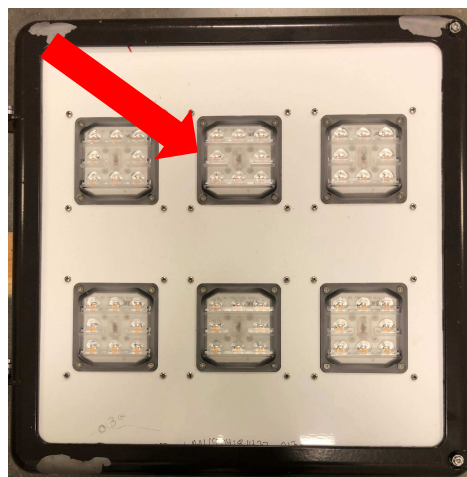
#### Maximum Measured Manufacturer Designated Source Temperature

Sample No.	Maximum Measured Source Temperature (°C)	Location	Maximum Rated Source Temperature (°C)
LAN1903191345-003A	65.2	Per specs above	106.9

#### LED In-Situ Picture – T<sub>s</sub>



#### LED In-Situ Picture – T<sub>s</sub> location



RESULTS OF TEST (cont'd)

In-Situ Maximum Measured Power Supply Case Temperature

Manufacturer Supplied Documentation:



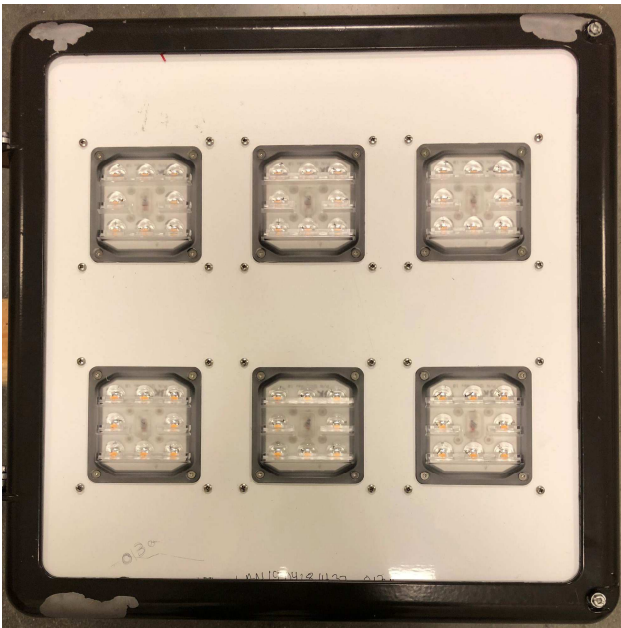
Sample No.	Maximum Measured Source Temperature (°C)	Location	Maximum Rated Source Temperature (°C)
LAN1903191345-003A	70.5	Per specs above	88.0

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:



Gregory V. Rosandich  
Technician  
Lighting Division

Attachment: None

Report Reviewed By:



Vladimir Kozak  
Engineering Supervisor  
Lighting Division