



FOR THE SCOPE OF  
ACCREDITATION UNDER NVLAP LAB  
CODE 100402-0.

# REPORT

3933 US ROUTE 11, CORTLAND, NEW YORK 13045

Project No. G101537614

Date: September 8, 2014

REPORT NO. 101537614CRT-017

TEST OF ONE LED GARAGE LIGHT

MODEL NO. HMI1513LEDOS78W50KE(X)  
DRIVER MODEL NO. OSRAM OPTRONIC OT40W/PRG1400C/UNV/DIM/J  
LED MODEL NO. NICHIA 757DT

RENDERED TO

SPECTRUM LIGHTING, INC.  
994 JEFFERSON ST  
FALL RIVER, MA 02721

**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 Q500506321.

**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 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 HMI1513LEDOS78W50KE(x). The sample was received by Intertek on August 22, 2014, in undamaged condition and one sample was tested as received. The sample designation was CRT1408220952-001.

**DATES OF TESTS:** August 28, 2014 through September 5, 2014

---

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to copy or distribute this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

SUMMARY

Model No.:	HMI1513LEDOS78W50KE(x)
Description:	LED GARAGE LIGHT

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	7020	7019
Total Power (W)	75.87	75.43
Lumen Efficacy (LPW)	92.53	93.05

Criteria	Result
Power Factor at 120Vac	0.991
Power Factor at 277Vac	0.912
Current ATHD % at 120Vac	5.56
Current ATHD % at 277Vac	17.59
Correlated Color Temperature (CCT - K)	5313
Color Rendering Index (CRI - Ra)	88.4
Color Rendering Index (CRI - R9)	49.1
DUV	0.001
Chromaticity Coordinate (x)	0.337
Chromaticity Coordinate (y)	0.342
Chromaticity Coordinate (u')	0.209
Chromaticity Coordinate (v')	0.479
Maximum In-Situ Source Temperature Point (°C)	48.9

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date
Yokogawa Power Analyzer	WT1600	E474	03/07/14	03/07/15
LABSPHERE 3M	W/ CDS 1100	N307	VBU	VBU
Fluke Temperature Meter	53 II	T1318	03/21/14	03/21/15
Elgar Power Supply	CW1251	---	VBU	VBU
Extech Hygro-Thermometer	445703	T1366	11/27/13	11/27/14
SORENSEN POWER SUPPLY	XFR 150-8	---	VBU	VBU
NIST Spectral Flux Standard Source	RF1024	---	09/18/10	100 hrs of use
LSI High Speed Mirror Goniometer	6440	---	08/25/14	09/25/14
Elgar Power Supply	CW1251	---	VBU	VBU
Yokogawa Power Analyzer	WT210	E464	04/17/14	04/17/15
ExTech Hygro Thermometer	445703	T1357	11/25/13	11/25/14
Fisher Scientific	14-649-9	N1405	08/25/14	08/25/15
M-D Building Products	Smart Tool	L112	03/14/14	03/15/15
Extech Hygro-Thermometer	445703	T1355	12/30/13	12/30/14
Fluke Multimeter	87	E259	03/20/14	03/20/15
Fluke Temp Meter	53 II	N1324	03/21/14	03/21/15



## 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 or Ten 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 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.

### 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)
CRT1408220952-001	UP	120.0	637.7	75.87	0.991	5.56	7020	92.53
		277.0	312.8	79.07	0.912	17.59		

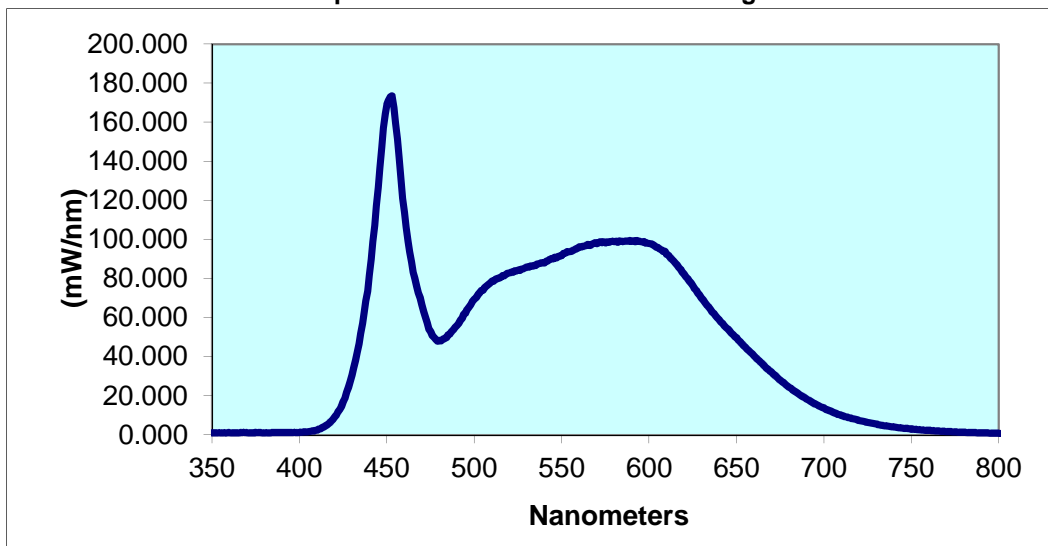
  

Correlated Color Temperature (K)	CRI -Ra	CRI -R9	DUV	CIE 31' Chromaticity Coordinate	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
5313	88.4	49.1	0.001	0.337	0.342	0.209	0.479

**Spectral Distribution over Visible Wavelengths**

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	1.008	440	81.700	530	85.900	620	82.160	710	10.040
355	1.052	445	126.600	535	86.690	625	76.440	715	8.690
360	1.179	450	169.100	540	88.050	630	70.040	720	7.468
365	1.000	455	159.500	545	90.120	635	64.210	725	6.431
370	1.165	460	113.700	550	92.000	640	58.980	730	5.521
375	1.266	465	83.240	555	93.890	645	54.190	735	4.691
380	0.939	470	66.660	560	96.180	650	49.590	740	4.050
385	1.105	475	52.730	565	97.430	655	44.850	745	3.486
390	1.136	480	48.380	570	98.050	660	40.530	750	3.013
395	1.103	485	51.210	575	98.280	665	36.120	755	2.627
400	1.291	490	56.060	580	99.020	670	32.070	760	2.302
405	1.602	495	62.400	585	99.000	675	28.000	765	1.968
410	2.520	500	69.540	590	99.060	680	24.420	770	1.730
415	4.730	505	74.120	595	98.920	685	21.360	775	1.518
420	8.967	510	78.580	600	98.030	690	18.400	780	1.312
425	16.870	515	80.630	605	95.860	695	15.860		
430	30.600	520	82.840	610	92.440	700	13.700		
435	51.890	525	84.340	615	88.010	705	11.650		

**Spectral Data Over Visible Wavelengths**



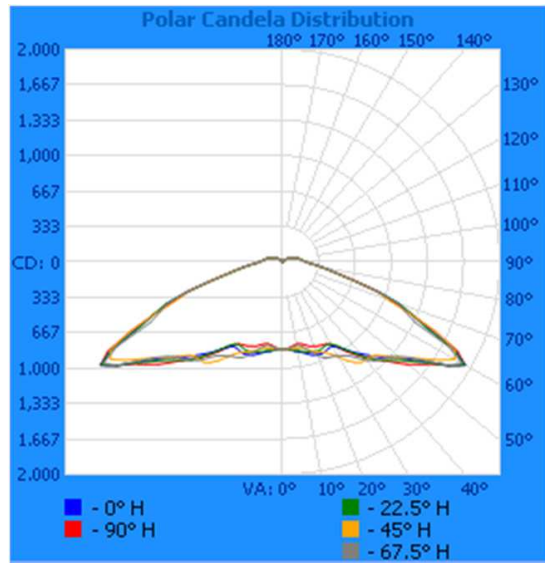
RESULTS OF TEST (cont'd)

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)
CRT1408220952-001	UP	120.0	633.3	75.43	0.992	7019	93.05

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	818	818	818	818	818
5	830	828	819	810	807
10	857	850	824	795	780
15	898	876	853	844	808
20	926	897	897	936	842
25	928	886	942	992	861
30	915	893	1032	1023	895
35	1008	1004	1153	1078	1027
40	1129	1163	1196	1206	1169
45	1261	1307	1239	1296	1307
50	1409	1440	1403	1381	1499
55	1637	1656	1590	1627	1673
60	1940	1933	1831	1907	1937
65	1482	1452	1562	1345	1556
70	1118	1142	1034	1143	1055
75	704	681	700	675	686
80	441	431	432	428	431
85	310	294	294	296	300
90	218	214	216	215	217
95	184	185	185	184	185
100	163	164	164	162	164
105	139	141	139	139	141
110	113	115	114	114	115
115	91	91	89	90	92
120	74	73	71	71	73
125	58	57	56	57	58
130	44	43	41	42	43
135	32	32	30	31	32
140	21	21	20	21	21
145	11	12	11	11	11
150	3	4	3	3	4

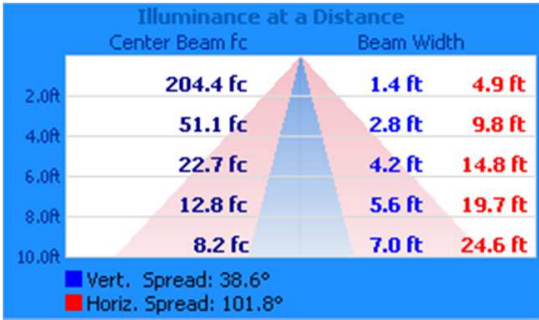


**RESULTS OF TEST (cont'd)**

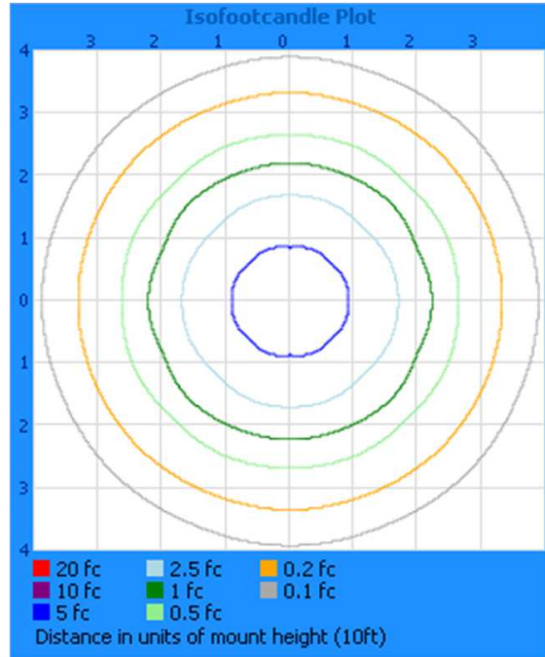
**Illumination Plots**

Mounting Height: 10 ft.

**Illuminance - Cone of Light**



**Isoillumination Plot**



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

Zone	Lumens	% Luminaire
0-30	754.2	10.7
0-40	1427	20.3
0-60	3911	55.7
60-90	2582	36.8
0-90	6493	92.5
90-180	526.2	7.5
0-180	7019	100.0

**Zonal Lumens and Percentages at 25°C**

Zone	Lumens	% Luminaire
0-10	78.2	1.1
10-20	244.8	3.5
20-30	431.2	6.1
30-40	673.1	9.6
40-50	1000	14.2
50-60	1484	21.1
60-70	1486	21.2
70-80	763.4	10.9
80-90	333.3	4.7
90-100	203.5	2.9
100-110	147.8	2.1
110-120	91.1	1.3
120-130	51.6	0.7
130-140	24.5	0.3
140-150	7.4	0.1
150-160	0.3	0.0

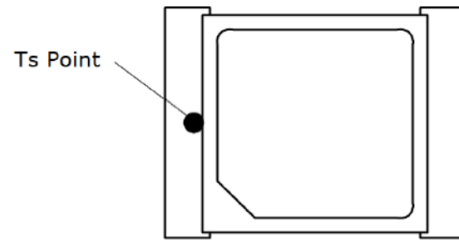
**RESULTS OF TEST (cont'd)**

**In-Situ Maximum Measured LED Source Temperature**

Manufacturer Supplied Documentation:  
LED model identified as: Nichia 757DT

**Absolute Maximum Ratings**

Item	Symbol	Absolute Maximum Rating	Unit
Forward Current	$I_F$	180	mA
Pulse Forward Current	$I_{FP}$	240	mA
Allowable Reverse Current	$I_R$	85	mA
Power Dissipation	$P_D$	594	mW
Operating Temperature	$T_{opr}$	-40~100	°C
Storage Temperature	$T_{stg}$	-40~100	°C
Junction Temperature	$T_J$	120	°C



**Initial Electrical/Optical Characteristics**

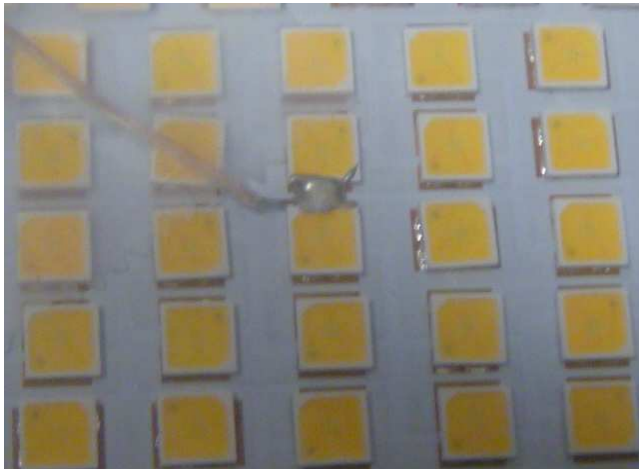
Item	Symbol	Condition	Typ	Max	Unit
Forward Voltage	$V_F$	$I_F=65mA$	2.9	-	V
R70	Luminous Flux	$\Phi_v$ , $I_F=65mA$	28.6	-	lm
	Luminous Intensity	$I_v$ , $I_F=65mA$	9.76	-	cd
	Color Rendering Index	$R_a$ , $I_F=65mA$	73	-	-
R8000	Luminous Flux	$\Phi_v$ , $I_F=65mA$	27.3	-	lm
	Luminous Intensity	$I_v$ , $I_F=65mA$	9.36	-	cd
	Color Rendering Index	$R_a$ , $I_F=65mA$	83	-	-
Chromaticity Coordinate	x	$I_F=65mA$	0.41	-	-
	y	$I_F=65mA$	0.39	-	-
Thermal Resistance	$R_{j\theta}$	-	13	19	°C/W

Maximum Junction Temperature from LED specification ( $T_J$ ) = 120°C  
 Thermal Resistance Formula from LED specification = 19°C/W  
 Maximum Forward Voltage ( $V_f$ ) from LED specification = 2.9V  
 Measured LED Current = 133.2mA  
 Calculated LED Wattage =  $V_f \times \text{Measured LED Current} = 0.386W$   
 Maximum Source Temperature ( $T_s$ ) =  $T_J - (\text{LED Wattage} \times \text{Thermal Resistance}) = 80°C$

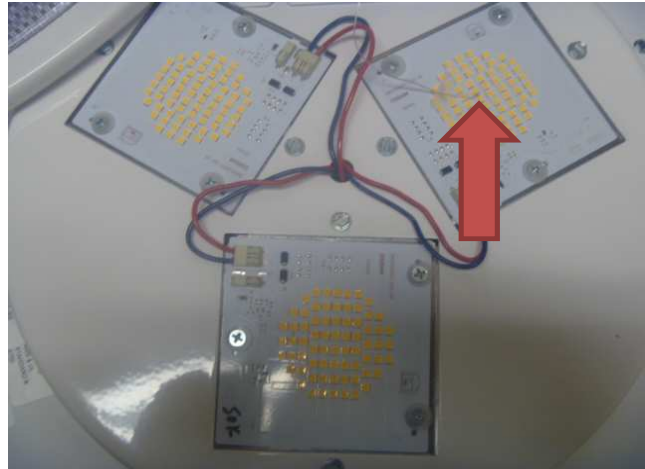
**Maximum Measured Manufacturer Designated Source Temperature**

Sample No.	Maximum Measured Source Temperature (°C)	Location	Maximum Rated Source Temperature (°C)
CRT1408220952-001	48.9	Per diagram	80

**In-Situ Picture –  $T_s$**



**In-Situ Picture –  $T_s$  locator**



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:



Gerald Gray  
Associate Engineer  
Lighting Division

Attachment: None

Report Reviewed By:



Jeffrey Davis  
Engineering Manager  
Lighting Division