



Report No.: GZE160582-A

NVLAP LAB CODE 201011-0

LM-79-08 Test Report

For

LIGHT EFFICIENT DESIGN

(Brand Name: N/A)

188 S. Northwest Highway Cary, IL 60013

High-bay Luminaires for Commercial and Industrial Buildings

Model name(s): LED-9150-XXK

Remark: The letter "XXK" represents the CCT,35=3500K,40=4000K,50=50000K

Representative (Tested) Model: LED-9150-35K
LED-9150-50K

Model Difference: All construction and rating are the same, except CCT.

Test & Report By:

Garman Mo

Engineer: Garman Mo

Date: June.7,2016

Review By:

Tommy Liang

Manager: Tommy Liang

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Laboratory: Standard-Tech Co. Ltd Testing Center
NVLAP CODE: 201011-0

Report Format Number STD/QR4909-H/2

Address: Standard-Tech Building, No.6 Guanhong Road,Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320 Fax: 8620-32290422 <http://www.standard-tech.com>

U.S. Department of Energy

Lighting Facts™ Uniform LM-79 Reporting Template
Laboratory Information:

Name of Test Laboratory	Standard-Tech Co., Ltd.
Date of Test Report	June.7,2016
Test Report No.	GZE160582-A
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	LIGHT EFFICIENT DESIGN	
Brand Name	N/A	
Model Number	LED-9150-35K	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	High-bay Luminaires for Commercial and Industrial Buildings	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	

Integrating Sphere
Goniophotometer
Electrical Measurements:
Output
Output

Input Wattage	--	161.2	W
Input Current	--	1.365	A
Input Voltage (ac)	--	120.0	V
Power Factor	--	0.9842	
Off-State Power	--	0	W

Photometric Characteristics

Total Initial Lumen Output	--	18712	lm
Initial Lumen Efficacy	--	116.08	lm/w
Correlated color temperature / CCT	3603	--	K
Color rendering index / CRI	81.2	--	
R9 Value	2	--	
Duv	0.0022	--	
Luminous Intensity Distribution			
Center beam candlepower (if applicable)		6398	cd
Beam angle (if applicable)		117.0	°
Zonal lumens in the 0°-60° zone		80.4	%
Zonal lumens in the 60°-90° zone	---	19.4	%
Zonal lumens in the 90°-120° zone		0.1	%
Zonal lumens in the 120°-180° zone		0.1	%

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Laboratory Information:

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Date of Test Report	June.7,2016
Test Report No.	GZE160582-A
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	LIGHT EFFICIENT DESIGN	
Brand Name	N/A	
Model Number	LED-9150-50K	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	High-bay Luminaires for Commercial and Industrial Buildings	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	

Electrical Measurements:	Integrating Sphere	Goniophotometer	
	Output	Output	
Input Wattage	140.9	--	W
Input Current	1.192	--	A
Input Voltage (ac)	120.0	--	V
Power Factor	0.9850	--	
Off-State Power	0	--	W

Photometric Characteristics

Total Initial Lumen Output	18780	--	lm
Initial Lumen Efficacy	133.29	--	lm/w
Correlated color temperature / CCT	5125	--	K
Color rendering index / CRI	84.9	--	
R9 Value	15	--	
Duv	0.0019	--	
Luminous Intensity Distribution			
Center beam candlepower (if applicable)	-----		cd
Beam angle (if applicable)			°
Zonal lumens in the 0°-60° zone			%
Zonal lumens in the 60°-90° zone			%
Zonal lumens in the 90°-120° zone			%
Zonal lumens in the 120°-180° zone			%

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Date of Receipt	: June.4,2016
Date of Test	: June.6,2016
Test item	: Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
Reference Standard	IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources CIE 15-2004 Technical Report Colorimetry IESNA LM-16-93 Practical Guide to Colorimetry of Light Source IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

Test Methods

1. Photometric and Electrical measurements – Light Distribution Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals.

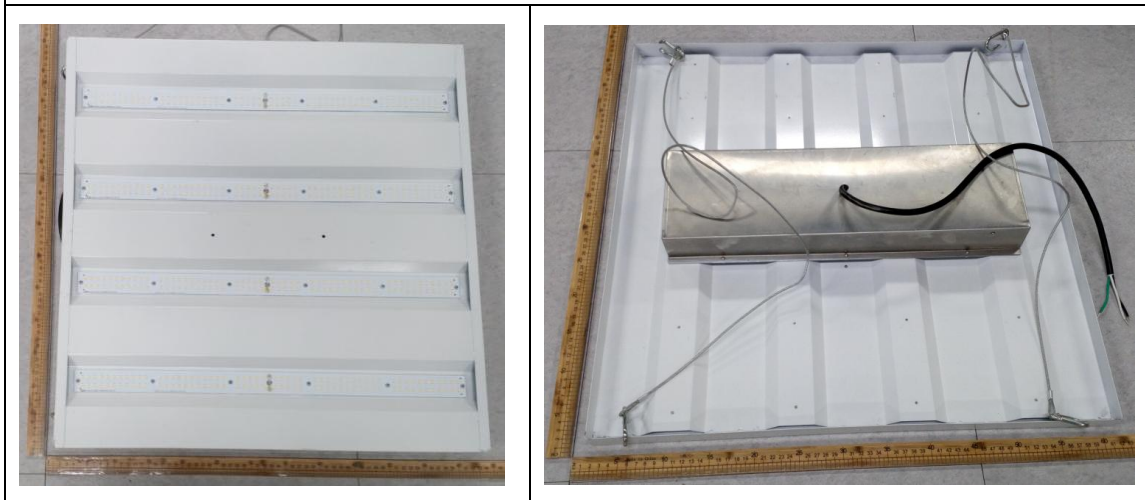
2. Photometric and Electrical Measurements – Integrating Sphere Method:

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at least 5 nm intervals over the range of 380 to 780 nm.

1. Product Information:

Brand Name	N/A
Model Number	LED-9150-XXX
Luminaire Type	High-bay Luminaires for Commercial and Industrial Buildings
Rated Voltage / Frequency	100 ~ 277 Vac, 50/60Hz
Nominal Power	150W
Rated Initial Lamp Lumen	--
Declared CCT	3500K, 4000K,5000K
LED Manufacturer	Guangzhou Hongli Opto-Electronic Co., Ltd.
LED Model	HL-A-2835DW-S1-08-HR3
Sample Receipt Date	June.4,2016
Sample Number	GZE160582-A1(3500K),A2(5000K)

Photo



2.1 Electrical, Photometric and Chromaticity Measurements (Refer to Work Instruction QD25)
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IES LM-79 2008

Test date	2016-06-06	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	LED-9150-35K		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160582	120.0	60	1.365	161.2	0.9842	16.61
-A1	277.0	60	0.6312	158.8	0.9082	19.96

Color Data:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	81.2
R9	2
CCT (K)	3603
Chromaticity (x, y)	x=0.4018 y=0.3939
Chromaticity (u', v')	u'=0.2322 v'=0.5121
Duv	0.0022

Special Color Rendering Indices			
R1	79	R9	2
R2	90	R10	76
R3	96	R11	75
R4	77	R12	61
R5	79	R13	82
R6	86	R14	98
R7	84	R15	72
R8	59	--	--

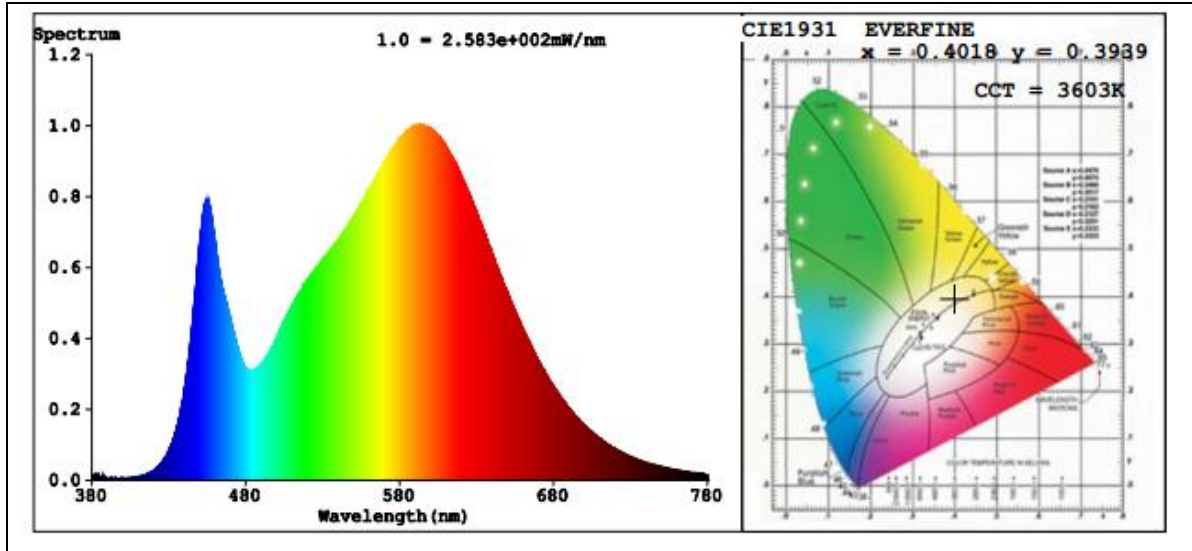
Goniophotometer Method :

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	18712
Luminous Efficacy (lm/W)	116.08
Beam Angle°	117.0
Center Beam Candle Power (cd)	6398

Goniophotometer Method for 277V:

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	18857
Luminous Efficacy (lm/W)	118.74

Spectral Power Distribution & Chromaticity Diagram



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Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	5,049.7	27%
0-40	8,348.8	44.6%
0-60	15,037.6	80.4%
60-90	3,629.1	19.4%
70-100	1,187.1	6.3%
90-120	16.4	0.1%
0-90	18,666.7	99.8%
90-180	42.9	0.2%
0-180	18,709.6	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	606.5	3.2%	90-100	3.3	0%
10-20	1,749.6	9.4%	100-110	5.7	0%
20-30	2,693.6	14.4%	110-120	7.4	0%
30-40	3,299.1	17.6%	120-130	7.9	0%
40-50	3,483.4	18.6%	130-140	6.8	0%
50-60	3,205.5	17.1%	140-150	5.0	0%
60-70	2,445.2	13.1%	150-160	3.7	0%
70-80	1,083.3	5.8%	160-170	2.2	0%
80-90	100.5	0.5%	170-180	0.9	0%

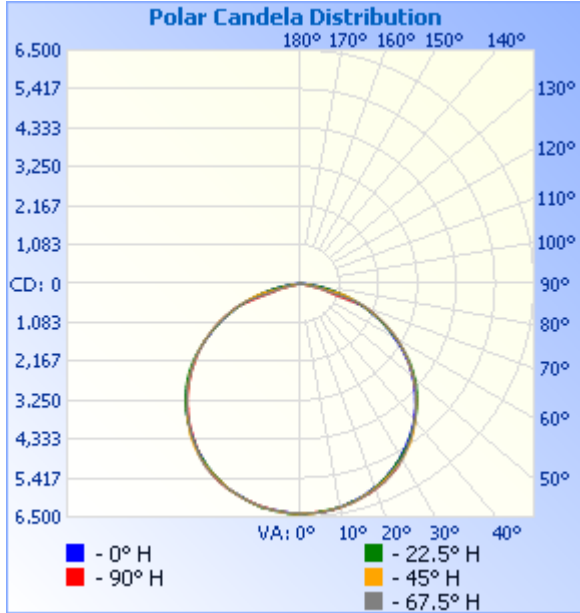
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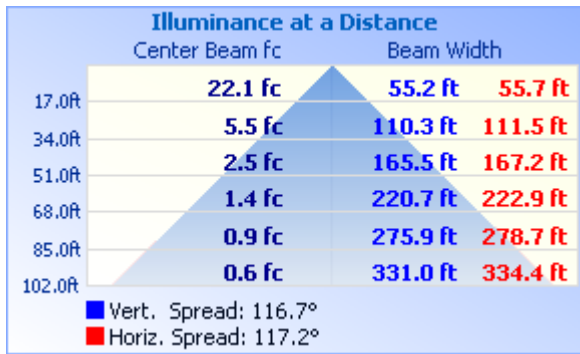
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Photometric Data



Illuminance Plots



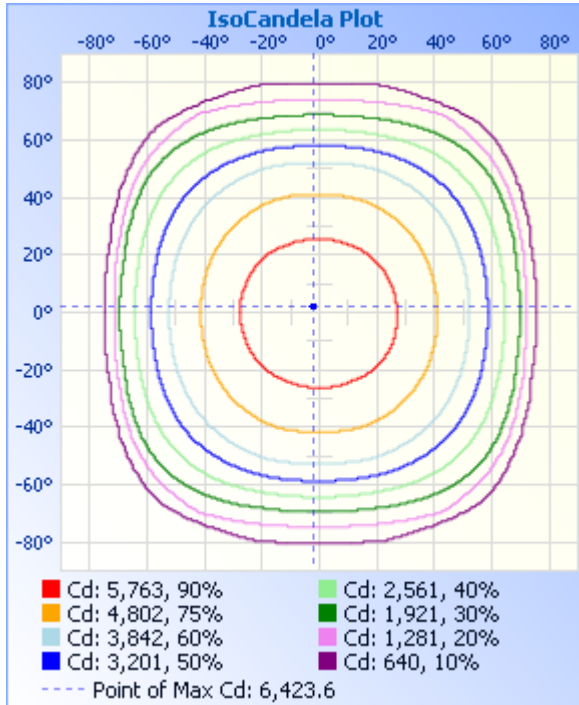
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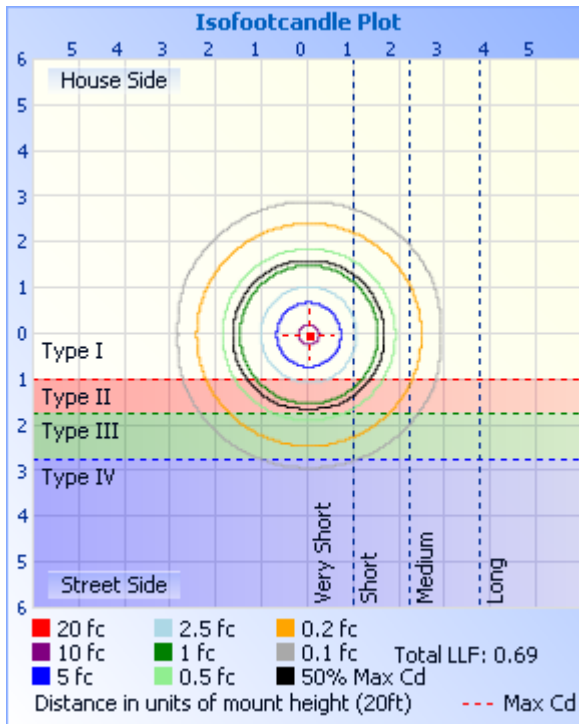
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ISOCANDELA DIAGRAM



ISOLUX DIAGRAM



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Candela Table - Type C

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	6398	6398	6398	6398	6398	6398	6398	6398	6398	6398	6398	6398	6398	6398	6398	6398	6398
1	6399	6424	6397	6414	6401	6392	6393	6392	6387	6419	6404	6395	6406	6388	6393	6391	6399
2	6392	6402	6406	6401	6393	6394	6393	6389	6384	6414	6399	6396	6404	6386	6386	6386	6392
3	6396	6397	6409	6409	6390	6393	6383	6383	6383	6418	6400	6392	6388	6386	6369	6387	6396
4	6401	6393	6398	6401	6383	6383	6387	6387	6375	6392	6383	6378	6377	6377	6365	6385	6401
5	6398	6363	6397	6393	6379	6375	6377	6377	6360	6356	6387	6374	6373	6364	6352	6371	6398
6	6382	6360	6376	6395	6384	6361	6366	6366	6349	6376	6360	6363	6360	6349	6349	6364	6382
7	6369	6351	6366	6375	6363	6349	6352	6356	6345	6365	6350	6349	6342	6336	6340	6342	6369
8	6359	6347	6357	6361	6365	6341	6332	6343	6333	6341	6333	6344	6326	6317	6327	6334	6359
9	6330	6324	6337	6343	6350	6323	6321	6334	6324	6334	6324	6323	6308	6301	6310	6318	6330
10	6311	6324	6329	6330	6334	6309	6309	6307	6315	6330	6312	6300	6293	6285	6287	6301	6311
11	6292	6303	6309	6311	6318	6290	6283	6289	6284	6294	6284	6279	6276	6259	6274	6278	6292
12	6265	6273	6285	6295	6282	6270	6261	6255	6262	6265	6265	6260	6255	6232	6254	6259	6265
13	6241	6243	6275	6278	6272	6245	6236	6248	6239	6250	6238	6235	6224	6216	6230	6234	6241
14	6222	6234	6249	6251	6248	6226	6221	6209	6211	6213	6212	6209	6210	6193	6203	6214	6222
15	6195	6206	6224	6221	6222	6205	6195	6186	6162	6176	6184	6193	6185	6167	6177	6179	6195
16	6170	6180	6180	6202	6201	6182	6155	6163	6141	6155	6156	6156	6161	6141	6144	6153	6170
17	6137	6149	6155	6168	6169	6150	6135	6137	6115	6120	6129	6131	6133	6121	6117	6121	6137
18	6099	6123	6130	6157	6151	6118	6095	6105	6083	6094	6088	6090	6105	6092	6083	6089	6099
19	6067	6080	6094	6113	6123	6093	6068	6065	6058	6074	6061	6065	6076	6049	6036	6049	6067
20	6028	6038	6058	6096	6090	6061	6028	6040	6026	6021	6028	6040	6048	6007	6012	6009	6028
21	6005	6003	6025	6053	6057	6034	5989	6005	5978	5989	5973	6006	6008	5980	5980	5977	6005
22	5957	5962	5992	6027	6026	6003	5959	5965	5930	5927	5945	5979	5985	5944	5940	5931	5957
23	5915	5916	5962	5997	5991	5975	5924	5925	5897	5886	5903	5933	5942	5908	5893	5903	5915
24	5872	5886	5902	5952	5945	5930	5880	5871	5849	5851	5862	5892	5898	5876	5848	5861	5872
25	5817	5829	5865	5905	5903	5893	5832	5817	5806	5805	5820	5863	5851	5837	5811	5812	5817
26	5766	5790	5821	5860	5861	5840	5800	5775	5760	5759	5779	5811	5803	5787	5766	5759	5766
27	5732	5738	5781	5802	5820	5796	5761	5720	5719	5703	5735	5760	5754	5732	5730	5711	5732

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28	5679	5664	5740	5772	5771	5747	5716	5668	5666	5648	5683	5715	5693	5677	5679	5657	5679
29	5623	5632	5687	5704	5704	5698	5678	5625	5594	5591	5643	5651	5632	5628	5635	5609	5623
30	5569	5578	5648	5647	5624	5644	5633	5564	5536	5554	5589	5591	5554	5571	5594	5554	5569
31	5496	5519	5598	5585	5561	5564	5584	5505	5499	5497	5535	5522	5484	5501	5535	5495	5496
32	5436	5458	5534	5520	5491	5486	5517	5452	5436	5441	5474	5437	5424	5434	5475	5433	5436
33	5388	5422	5475	5454	5420	5413	5452	5403	5376	5373	5415	5374	5356	5358	5405	5382	5388
34	5312	5361	5423	5369	5364	5352	5382	5350	5302	5306	5354	5306	5285	5289	5352	5330	5312
35	5261	5287	5349	5321	5304	5288	5325	5284	5239	5245	5286	5243	5217	5217	5281	5259	5261
36	5190	5216	5280	5254	5233	5218	5263	5208	5170	5186	5216	5173	5142	5157	5215	5188	5190
37	5128	5156	5209	5169	5161	5157	5192	5152	5107	5119	5130	5095	5076	5085	5149	5122	5128
38	5060	5090	5126	5090	5087	5085	5118	5087	5039	5041	5044	5026	5008	5007	5068	5055	5060
39	4993	5020	5042	5024	5014	5011	5017	5009	4974	4980	4967	4943	4928	4935	4986	4985	4993
40	4909	4958	4958	4945	4939	4936	4943	4932	4889	4903	4904	4858	4852	4860	4893	4918	4909
41	4837	4887	4877	4874	4864	4858	4861	4863	4823	4837	4810	4803	4777	4782	4801	4837	4837
42	4763	4814	4790	4796	4783	4773	4773	4794	4742	4769	4727	4725	4688	4699	4730	4764	4763
43	4684	4739	4715	4710	4706	4693	4698	4718	4656	4690	4648	4645	4618	4626	4649	4699	4684
44	4598	4669	4630	4636	4620	4609	4626	4645	4575	4615	4558	4552	4534	4544	4567	4619	4598
45	4509	4587	4552	4550	4538	4529	4537	4574	4499	4532	4469	4473	4453	4457	4491	4540	4509
46	4430	4505	4462	4466	4458	4446	4449	4493	4402	4460	4386	4393	4367	4382	4404	4459	4430
47	4343	4432	4378	4382	4372	4356	4355	4401	4335	4364	4306	4299	4280	4284	4315	4384	4343
48	4257	4335	4287	4306	4288	4273	4267	4324	4232	4288	4211	4214	4189	4195	4227	4310	4257
49	4171	4262	4194	4209	4201	4181	4171	4227	4142	4192	4123	4118	4098	4112	4126	4219	4171
50	4071	4164	4107	4117	4113	4089	4078	4125	4043	4109	4030	4021	4007	4022	4037	4118	4071
51	3988	4062	4011	4012	4015	3994	3991	4039	3948	4009	3941	3935	3914	3928	3944	4029	3988
52	3887	3971	3916	3926	3918	3902	3893	3948	3856	3922	3850	3840	3824	3839	3856	3924	3887
53	3795	3871	3822	3827	3825	3814	3802	3857	3770	3815	3751	3744	3718	3742	3754	3845	3795
54	3702	3774	3724	3732	3723	3720	3702	3745	3674	3710	3650	3652	3628	3647	3657	3743	3702
55	3584	3658	3627	3635	3629	3613	3601	3631	3574	3599	3562	3546	3533	3543	3557	3628	3584
56	3487	3541	3526	3533	3519	3510	3500	3517	3471	3490	3458	3449	3439	3443	3454	3517	3487
57	3381	3421	3420	3436	3417	3409	3394	3406	3351	3372	3352	3343	3339	3345	3353	3409	3381
58	3250	3304	3316	3329	3309	3303	3285	3285	3231	3255	3245	3236	3234	3244	3252	3285	3250

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59	3135	3199	3206	3218	3201	3196	3176	3164	3110	3137	3138	3130	3128	3141	3147	3168	3135
60	3008	3068	3095	3107	3093	3089	3067	3043	2988	3022	3030	3022	3014	3031	3040	3037	3008
61	2907	2945	2992	3004	2987	2984	2958	2914	2868	2894	2916	2912	2906	2924	2930	2913	2907
62	2797	2812	2876	2892	2875	2871	2853	2795	2765	2773	2808	2805	2800	2813	2824	2796	2797
63	2680	2704	2762	2783	2760	2759	2742	2679	2654	2650	2701	2696	2691	2700	2711	2680	2680
64	2570	2586	2653	2665	2641	2642	2625	2563	2548	2539	2592	2592	2578	2595	2600	2569	2570
65	2448	2476	2535	2545	2526	2528	2510	2459	2426	2429	2474	2468	2462	2480	2491	2459	2448
66	2314	2356	2405	2422	2409	2411	2381	2348	2285	2315	2351	2347	2349	2364	2355	2334	2314
67	2192	2225	2272	2300	2300	2291	2250	2211	2157	2185	2218	2237	2233	2250	2223	2201	2192
68	2082	2102	2146	2187	2180	2172	2127	2072	2050	2051	2092	2128	2121	2135	2104	2073	2082
69	1970	1979	2026	2074	2063	2055	2011	1949	1936	1934	1974	2008	2006	2019	1994	1954	1970
70	1837	1861	1906	1957	1939	1941	1893	1833	1817	1818	1863	1891	1886	1900	1874	1845	1837
71	1705	1747	1785	1834	1675	1817	1774	1716	1679	1704	1745	1768	1527	1777	1754	1719	1705
72	1593	1624	1663	1692	1048	1641	1642	1583	1563	1565	1619	1579	1167	1443	1633	1599	1593
73	1481	1500	1542	1243	829	1083	1508	1463	1444	1443	1488	965	808	1103	1512	1479	1481
74	1352	1376	1420	790	759	776	1391	1349	1310	1329	1371	748	747	764	1392	1365	1352
75	1234	1248	1306	703	697	700	1276	1215	1200	1199	1253	685	686	693	1276	1236	1234
76	1110	1131	1159	640	497	636	1100	1101	1071	1088	1082	621	442	632	1117	1120	1110
77	995	1012	675	469	75	439	658	978	963	965	580	420	66	442	670	1001	995
78	882	900	490	76	52	63	487	869	846	854	474	53	50	72	492	891	882
79	768	783	430	49	49	48	422	753	737	738	412	47	47	47	434	775	768
80	659	673	313	46	48	46	253	643	626	636	247	45	46	44	290	666	659
81	555	568	48	44	45	44	41	542	527	536	39	43	43	42	49	563	555
82	453	468	37	41	42	41	37	437	429	433	36	40	40	40	36	464	453
83	370	239	35	37	36	37	35	215	346	197	34	36	35	36	33	256	370
84	280	153	31	31	30	31	32	146	263	144	31	31	30	31	30	161	280
85	203	37	26	25	24	24	26	28	186	24	26	25	23	25	26	43	203
86	135	21	21	19	18	19	20	21	122	21	20	18	17	18	20	21	135
87	80	17	15	14	14	14	15	17	70	17	15	14	13	13	15	17	80
88	24	12	10	8	7	7	9	12	20	12	9	8	7	8	10	12	24
89	9	7	4	2	2	3	4	6	8	7	4	3	2	2	4	7	9

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90	4	3	3	2	2	2	3	3	3	3	3	2	1	2	3	3	4
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93	3	3	3	2	2	2	3	3	3	3	3	2	1	2	3	3	3
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152	9	7	6	8	10	10	7	7	9	9	7	8	10	7	6	8	9
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2.2 Electrical, Photometric and Chromaticity Measurements (Refer to Work Instruction QD25)	IES LM-79 2008
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Test date	2016-05-25	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	LED-9150-50K		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160582	120.0	60	1.192	140.9	0.9850	15.90
-A2	277.0	60	0.5511	138.8	0.9092	18.67

Sphere-Spectroradiometer Method :

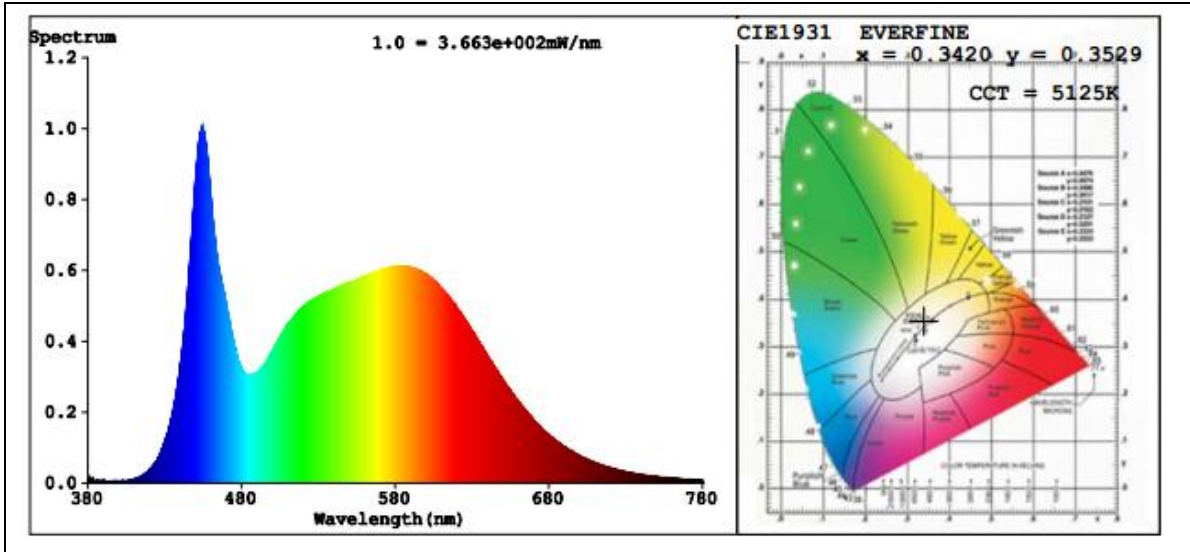
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	84.9
R9	15
CCT (K)	5125
Chromaticity (x, y)	x=0.3420 y=0.3529
Chromaticity (u', v')	u'=0.2088 v'=0.4848
Duv	0.0019
Total Initial Lumen Output(lm)	18780
Initial Lumen Efficacy(lm/w)	133.29

Special Color Rendering Indices			
R1	84	R9	15
R2	92	R10	79
R3	95	R11	82
R4	83	R12	64
R5	84	R13	86
R6	87	R14	98
R7	87	R15	79
R8	68	--	--

Sphere-Spectroradiometer Method for 277V:

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Initial Lumen Output(lm)	18926
Initial Lumen Efficacy(lm/w)	136.35

Spectral Power Distribution & Chromaticity Diagram



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3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-336	2 meter Integrating Sphere	2015-07-01	2016-06-30
ST-R-331	Spectral analysis system HAAS-2000	2015-07-01	2016-06-30
D204	Standard Lamp	2015-07-01	2016-06-30
PF2010	Power Meter for Integrating Sphere	2015-07-01	2016-06-30
EE-09	Goniophotometer system	2015-07-01	2016-06-30
D908S	Standard Lamp	2015-07-01	2016-06-30
PF210	Power Meter for Goniophotometer	2015-07-01	2016-06-30
ST-R-181A	Temperature Tester	2015-07-01	2016-06-30

Uncertainty:
Photometric Measurement (Sphere):1.74%
Chromaticity Measurement(Sphere):14.3K
Photometric Measurement(Goniophotometer):1.62%

******* END OF DATASHEET PACKAGE *******