



NVLAP LAB CODE 201011-0

Report No.: GZE150813-H

LM-79-08 Test Report

For

Hocan Group Co.,Ltd

(Brand Name: SEPICN LED LIGHTING)

Rm 1902, Easey Comm Bldg,253-261 Hennessy Rd
Wanchai, HONG KONG

Four-Foot Linear Replacement Lamps

Model name(s): HC-T8-4FT-13W-ID(X, Frosted),
HC-T8-4FT-13W-ID(X, Clear)

Representative (Tested) Model: HC-T8-4FT-13W-ID(3000K, Frosted)
HC-T8-4FT-13W-ID(5000K, Frosted), HC-T8-4FT-13W-ID(3000K, Clear)

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

Test & Report By:

Peeta Cao

Engineer: Peeta Cao

Date: Aug.07,2015

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-A/2

Address: 8th floor, Block B, No. 11 Caipin Road, Guangzhou Science City, Tianhe, 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	Aug.07,2015
Test Report No.	GZE150813-H
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	Hocan Group Co.,Ltd	
Brand Name	SEPICN LED LIGHTING	
Model Number	HC-T8-4FT-13W-ID(3000K, Frosted)	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Four-Foot Linear Replacement Lamps	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	1200	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	

Electrical Measurements:	Integrating Sphere	Goniophotometer	
	Output	Output	
Input Wattage	13.35	--	W
Input Current	0.1137	--	A
Input Voltage (ac)	120.0	--	V
Power Factor	0.9781	--	
Off-State Power	0	--	W

Photometric Characteristics

Total Initial Lumen Output	1696.2	--	lm
Initial Lumen Efficacy	127.06	--	lm/w
Correlated color temperature / CCT	2996	--	K
Color rendering index / CRI	84.2	--	
R9 Value	15	--	
Duv	0.0003	--	
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 Test Report	Aug.07,2015
Test Report No.	GZE150813-H
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	Hocan Group Co.,Ltd	
Brand Name	SEPICN LED LIGHTING	
Model Number	HC-T8-4FT-13W-ID(5000K, Frosted)	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Four-Foot Linear Replacement Lamps	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	1200	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	

Electrical Measurements:	Integrating Sphere Output	Goniophotometer Output	
Input Wattage	13.24	--	W
Input Current	0.1128	--	A
Input Voltage (ac)	120.0	--	V
Power Factor	0.9785	--	
Off-State Power	0	--	W

Photometric Characteristics

Total Initial Lumen Output	1736.8	--	lm
Initial Lumen Efficacy	131.17	--	lm/w
Correlated color temperature / CCT	5084	--	K
Color rendering index / CRI	85.1	--	
R9 Value	17	--	
Duv	0.0007	--	
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 Test Report	Aug.07,2015
Test Report No.	GZE150813-H
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	Hocan Group Co.,Ltd	
Brand Name	SEPICN LED LIGHTING	
Model Number	HC-T8-4FT-13W-ID(3000K, Clear)	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Four-Foot Linear Replacement Lamps	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	1200	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	

	Integrating Sphere	Goniophotometer	
Electrical Measurements:	Output	Output	
Input Wattage	13.34	--	W
Input Current	0.1142	--	A
Input Voltage (ac)	120.0	--	V
Power Factor	0.9737	--	
Off-State Power	0	--	W

Photometric Characteristics

Total Initial Lumen Output	1725.5	--	lm
Initial Lumen Efficacy	129.35	--	lm/w
Correlated color temperature / CCT	3008	--	K
Color rendering index / CRI	84.1	--	
R9 Value	15	--	
Duv	0.0005	--	
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	: Aug.03,2015
Date of Test	: Aug.05,2015
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	SEPICN LED LIGHTING
Model Number	HC-T8-4FT-13W-ID(X, Frosted), HC-T8-4FT-13W-ID(X, Clear)
Luminaire Type	Four-Foot Linear Replacement Lamps
Rated Voltage / Frequency	100 ~ 277 Vac, 50/60Hz
Nominal Power	13W
Rated Initial Lamp Lumen	--
Declared CCT	3000K,4000K,5000K
LED Manufacturer	Foshan NationStar Optoelectronics Co., LTD
LED Model	P3528W
Sample Receipt Date	Aug.03,2015
Sample Number	GZE150813-H1,H2(3000K),H3(5000K), I1(3000K)

Photo



2.1 Electrical, Photometric and Chromaticity Measurements (Refer to Work Instruction QD25)	IES LM-79 2008
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Test date	2015-08-05	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time(min)	90
Model Number	HC-T8-4FT-13W-ID(3000K, Frosted)		

Electrical Measurement for Bare Lamp :

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE150813	120.0	60	0.1137	13.35	0.9781	12.31
-H1	277.0	60	0.0531	13.41	0.9109	16.47

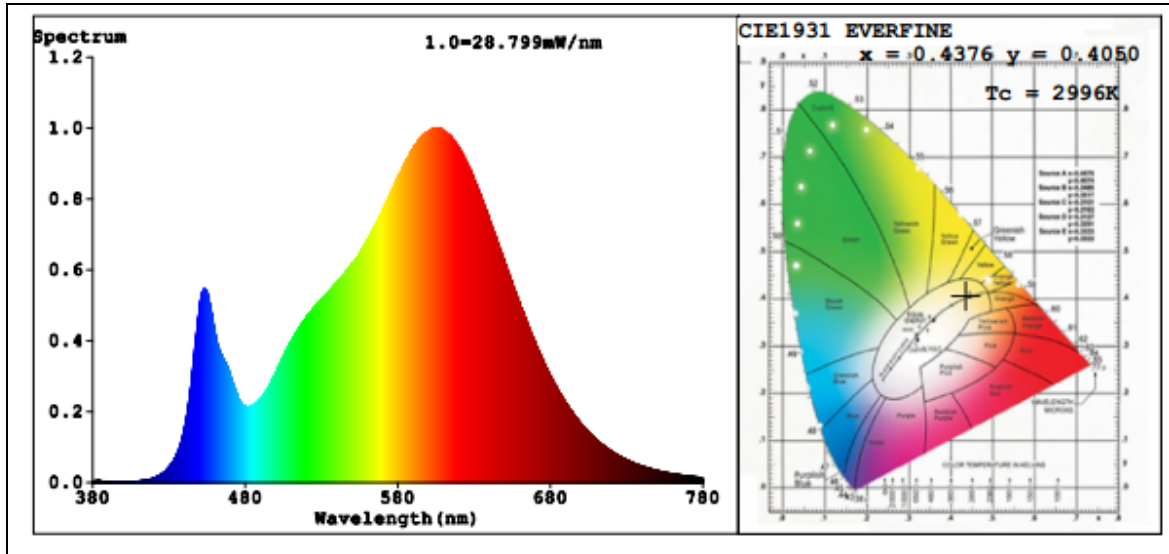
Sphere-Spectroradiometer Method for Bare Lamp:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	15
Frequency (Hz)	60	R2	92	R10	82
Color Rendering Index (CRI)	84.2	R3	97	R11	81
R9	15	R4	82	R12	70
CCT (K)	2996	R5	83	R13	85
Chromaticity (x, y)	x=0.4376 y=0.4050	R6	91	R14	99
Chromaticity (u', v')	u'=0.2506 v'=0.5219	R7	84	R15	76
Duv	0.0003	R8	62	--	--
Total Initial Lumen Output(lm)	1696.2				
Initial Lumen Efficacy(lm/w)	127.06				

Sphere-Spectroradiometer Method for 277V:

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Initial Lumen Output(lm)	1692.4
Initial Lumen Efficacy(lm/w)	126.21

Spectral Power Distribution & Chromaticity Diagram



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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	2015-08-05	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	HC-T8-4FT-13W-ID(3000K, FROSTED)		

Electrical Measurement for 2-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE150813	120.0	60	0.2342	27.10	0.9642	13.28
- H1,H2	277.1	60	0.1104	27.91	0.9122	16.44

Color Data for 2-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	9
Frequency (Hz)	60	R2	92	R10	81
Color Rendering Index (CRI)	82.6	R3	95	R11	78
R9	9	R4	79	R12	70
CCT (K)	2932	R5	81	R13	84
Chromaticity (x, y)	x=0.4410 y=0.4039	R6	90	R14	98
Chromaticity (u', v')	u'=0.2533 v'=0.5219	R7	82	R15	74
Duv	-0.0006	R8	59	--	--

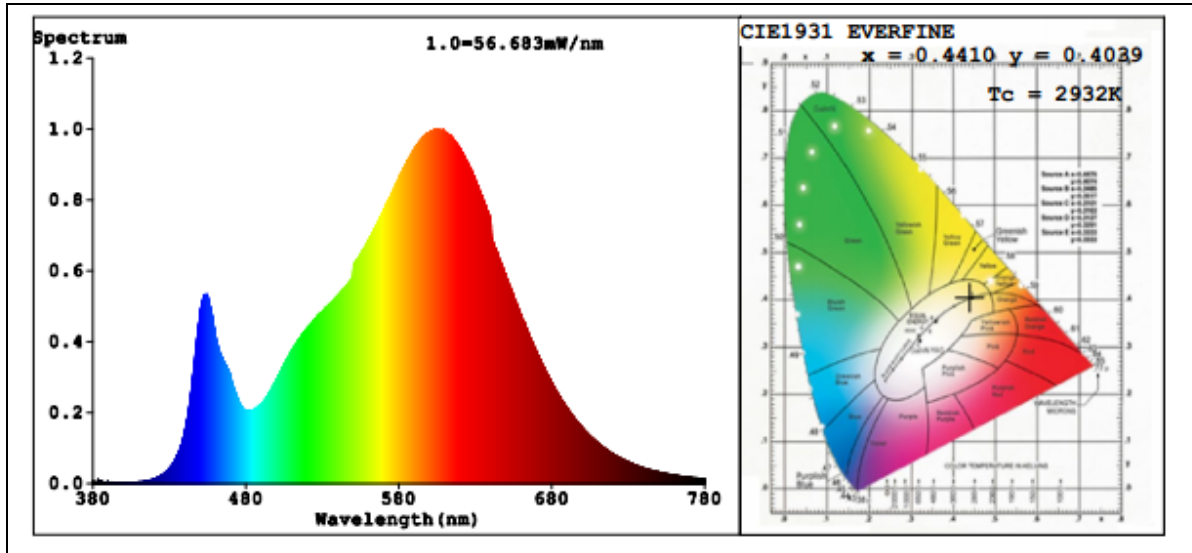
Goniophotometer Method in Lithonia 2PM3N 12 cell 2x4 parabolic:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	2709.8
Luminous Efficacy (lm/W)	100.01
Beam Angle°	106.8
Center Beam Candle Power (cd)	1075
S/MH(C0/180)	1.36
S/MH(C90/270)	1.20

Goniophotometer Method for 2-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic:

Parameter	Result
Test Voltage (V)	277.1
Frequency (Hz)	60
Total Luminous (lm)	2712.3
Luminous Efficacy (lm/W)	97.18

Spectral Power Distribution & Chromaticity Diagram



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Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	833.1	30.8%
0-40	1,379.1	50.9%
0-60	2,439.5	90%
60-90	269.9	10%
70-100	66.7	2.5%
90-120	0	0%
0-90	2,709.4	100%
90-180	0.0	0%
0-180	2,709.4	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	101.5	3.7%	90-100	0	0%
10-20	289.4	10.7%	100-110	0	0%
20-30	442.2	16.3%	110-120	0	0%
30-40	545.9	20.1%	120-130	0	0%
40-50	587.8	21.7%	130-140	0	0%
50-60	472.7	17.4%	140-150	0	0%
60-70	203.2	7.5%	150-160	0.0	0%
70-80	58.4	2.2%	160-170	0.0	0%
80-90	8.3	0.3%	170-180	0	0%

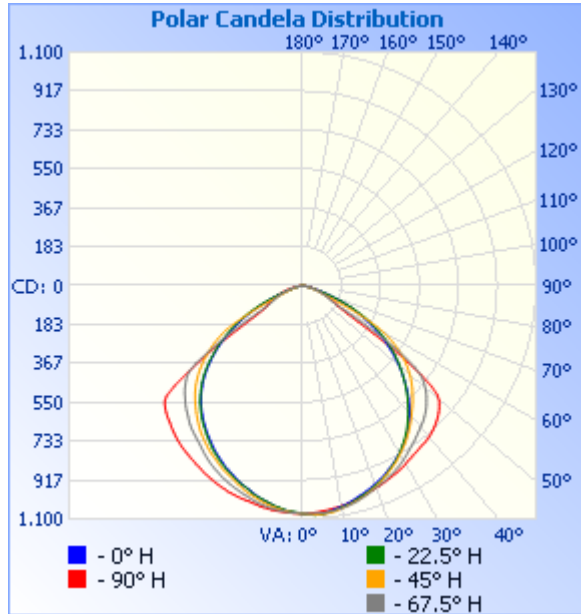
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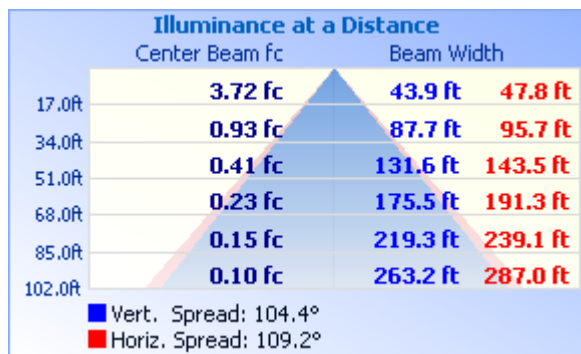
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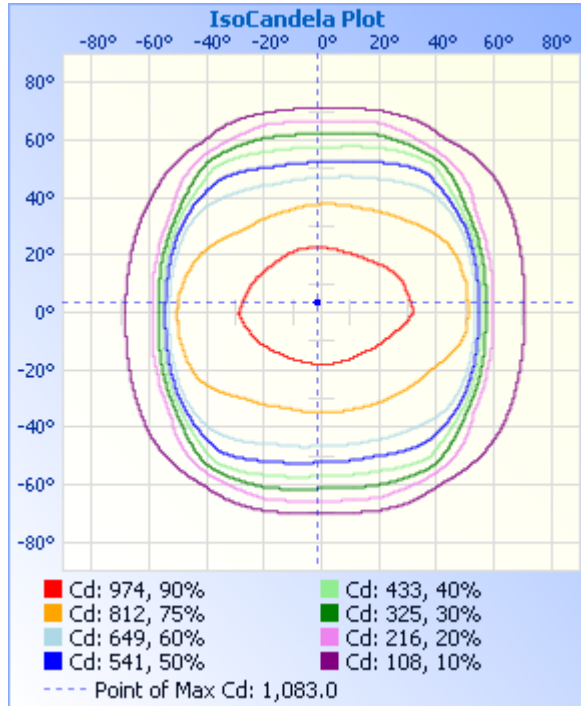
Photometric Data



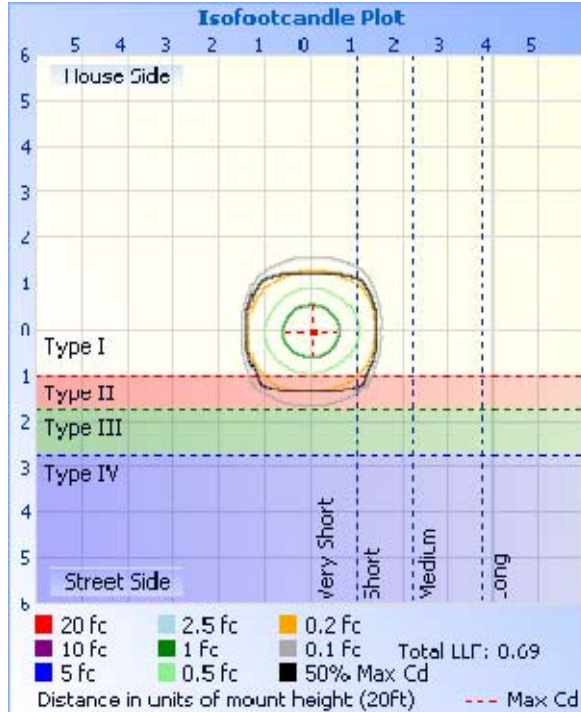
Illuminance Plots



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	1075	1075	1075	1075	1075	1075	1075	1075	1075	1075	1075	1075	1075	1075	1075	1075	1075
1	1077	1078	1076	1074	1074	1073	1072	1071	1072	1070	1073	1073	1074	1076	1075	1077	1077
2	1080	1080	1078	1076	1073	1073	1071	1070	1070	1068	1070	1072	1073	1076	1076	1079	1080
3	1081	1083	1081	1075	1071	1069	1068	1069	1066	1064	1069	1070	1072	1077	1078	1080	1081
4	1081	1082	1082	1075	1069	1068	1066	1066	1063	1062	1066	1069	1072	1076	1078	1079	1081
5	1080	1080	1079	1075	1066	1065	1064	1063	1059	1058	1063	1067	1070	1076	1078	1079	1080
6	1077	1078	1079	1074	1065	1063	1060	1056	1054	1052	1059	1065	1069	1077	1077	1076	1077
7	1071	1075	1077	1072	1062	1060	1056	1052	1049	1048	1054	1063	1068	1075	1075	1071	1071
8	1066	1070	1075	1070	1059	1057	1051	1046	1041	1041	1050	1059	1067	1075	1072	1066	1066
9	1061	1066	1071	1067	1058	1054	1046	1038	1034	1034	1044	1056	1062	1074	1070	1061	1061
10	1057	1060	1065	1064	1054	1050	1041	1031	1028	1028	1039	1052	1061	1072	1064	1055	1057
11	1052	1057	1061	1062	1052	1046	1035	1025	1023	1022	1033	1047	1058	1069	1059	1051	1052
12	1046	1053	1056	1058	1047	1043	1028	1019	1016	1018	1027	1042	1053	1066	1053	1045	1046
13	1039	1047	1051	1053	1044	1039	1021	1012	1008	1011	1020	1037	1051	1061	1048	1039	1039
14	1033	1040	1046	1049	1039	1033	1015	1005	999	1003	1014	1031	1047	1058	1042	1034	1033
15	1026	1034	1042	1043	1035	1028	1009	997	991	994	1008	1025	1046	1053	1037	1027	1026
16	1022	1028	1035	1037	1032	1023	1004	988	985	986	1001	1020	1043	1050	1031	1019	1022
17	1015	1023	1029	1032	1027	1018	997	980	978	980	993	1014	1041	1047	1024	1014	1015
18	1009	1016	1021	1026	1022	1012	989	973	971	973	985	1009	1038	1042	1018	1008	1009
19	1002	1009	1014	1019	1017	1005	982	966	961	966	976	1003	1034	1038	1010	1002	1002
20	995	1002	1007	1013	1013	999	973	958	951	959	967	996	1032	1032	1004	994	995
21	989	996	1000	1008	1010	994	965	948	944	949	960	990	1026	1027	997	987	989
22	981	988	992	1002	1006	988	957	939	935	941	955	984	1024	1022	991	979	981
23	974	981	983	997	1001	982	949	932	929	933	947	976	1018	1017	985	971	974
24	966	972	974	990	997	976	942	924	918	925	939	970	1014	1011	979	963	966
25	957	962	965	983	993	970	932	915	908	916	930	962	1009	1006	972	954	957
26	949	953	956	978	989	965	925	904	899	905	921	954	1005	1000	965	944	949
27	940	943	948	972	985	959	917	893	890	897	912	947	1000	993	957	934	940
28	931	933	939	964	981	954	909	884	880	887	905	938	994	986	949	926	931
29	921	923	929	957	976	948	901	874	869	877	896	929	989	978	942	916	921

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30	912	912	917	949	970	942	893	864	858	866	888	920	983	971	933	907	912
31	902	900	907	940	964	937	886	854	848	854	878	910	979	962	925	897	902
32	890	888	896	931	959	928	876	842	837	844	869	900	973	955	916	887	890
33	880	875	886	923	954	921	868	832	827	833	858	890	969	947	907	877	880
34	868	863	874	914	951	915	858	821	816	821	849	883	963	939	898	867	868
35	855	849	862	906	946	908	850	810	804	810	839	874	958	933	889	856	855
36	841	836	850	899	943	901	841	799	792	799	827	867	953	927	879	845	841
37	829	820	837	890	939	895	833	787	781	788	816	859	948	920	868	833	829
38	814	804	825	882	936	890	822	775	768	775	804	852	942	914	858	821	814
39	798	789	812	874	933	884	810	764	756	762	791	843	936	906	847	809	798
40	784	773	798	867	928	879	800	752	743	749	780	832	929	898	835	796	784
41	768	757	785	859	923	873	791	740	730	736	767	822	923	889	825	782	768
42	750	741	772	851	917	865	781	728	716	722	755	812	915	881	815	768	750
43	733	724	759	842	911	858	771	716	701	707	743	802	908	870	803	755	733
44	715	707	746	833	902	849	760	703	685	691	730	792	900	863	792	740	715
45	696	690	732	822	895	840	750	691	669	676	717	782	894	853	781	725	696
46	676	673	720	811	886	831	739	677	653	659	703	770	887	843	766	709	676
47	657	655	707	798	877	820	728	662	635	642	688	759	879	833	755	693	657
48	637	637	691	786	866	810	716	648	616	623	672	748	870	823	741	675	637
49	617	619	677	771	854	798	704	631	597	604	656	735	860	812	726	658	617
50	597	601	662	756	839	783	689	613	576	584	639	721	849	801	711	639	597
51	576	583	644	739	816	768	674	596	556	564	621	707	825	788	696	620	576
52	555	564	628	719	772	748	658	576	534	542	602	690	766	772	678	601	555
53	534	546	609	693	702	724	639	556	512	522	582	666	671	747	660	581	534
54	513	526	590	654	611	684	620	535	490	500	562	622	584	701	641	560	513
55	491	507	570	596	516	621	600	513	467	478	541	542	489	618	621	540	491
56	469	485	548	523	404	539	577	489	443	456	518	467	368	541	598	518	469
57	448	464	525	441	311	452	552	466	419	432	495	394	285	453	575	495	448
58	425	443	500	348	252	354	526	441	395	409	471	312	238	350	549	473	425
59	403	421	473	268	215	274	497	416	370	386	444	244	211	273	522	450	403
60	380	399	442	214	192	222	463	390	345	362	415	205	194	227	490	427	380
61	356	375	405	180	181	189	418	363	320	338	375	180	186	198	446	403	356

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62	333	352	358	159	172	170	364	336	294	312	321	165	180	180	389	378	333
63	310	328	305	147	162	158	302	307	269	286	269	155	172	171	331	352	310
64	286	302	250	137	153	149	240	279	243	260	220	147	164	163	268	325	286
65	263	276	195	128	143	139	183	249	218	233	170	139	156	154	207	297	263
66	241	250	152	119	134	129	143	218	193	205	134	131	148	145	165	269	241
67	216	224	123	110	125	119	118	189	168	179	112	123	139	136	137	241	216
68	191	197	104	101	116	110	103	161	144	153	96	114	130	127	119	213	191
69	167	169	93	93	107	101	92	134	121	128	86	106	122	119	108	184	167
70	143	141	83	85	98	92	82	109	100	104	77	97	113	110	97	156	143
71	121	114	73	77	90	84	73	87	83	83	69	89	105	101	87	129	121
72	103	92	65	70	82	76	64	70	70	67	61	81	97	93	78	104	103
73	86	75	56	63	74	68	55	58	58	56	53	74	88	84	69	86	86
74	72	62	49	56	66	61	48	49	49	47	46	67	80	76	60	71	72
75	59	51	42	49	59	53	41	41	41	39	40	59	73	68	53	59	59
76	48	42	36	43	53	46	35	35	34	33	34	51	64	61	46	49	48
77	39	35	30	37	45	40	30	29	29	27	29	44	56	53	39	40	39
78	32	28	25	31	39	33	25	24	24	23	24	37	48	45	33	33	32
79	26	23	22	26	33	28	21	20	20	19	20	32	41	38	28	27	26
80	21	19	18	22	28	24	18	17	16	15	17	26	35	32	23	21	21
81	17	16	15	18	23	19	15	13	13	12	14	22	29	26	19	17	17
82	13	12	12	15	19	16	12	10	10	10	12	18	23	21	16	14	13
83	10	10	10	12	15	13	9	8	8	7	9	14	18	17	12	10	10
84	8	7	7	9	12	10	7	6	5	5	7	11	14	12	9	8	8
85	5	5	5	7	9	7	5	4	3	4	5	8	10	9	7	6	5
86	4	3	3	4	6	4	3	2	2	2	3	5	7	6	4	4	4
87	2	2	2	2	4	2	1	1	1	1	1	3	3	3	2	2	2
88	1	1	1	1	1	0	0	0	0	0	0	1	1	1	0	1	1
89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
107	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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109	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
113	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
114	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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116	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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118	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
119	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
122	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
123	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
124	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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126	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
127	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
128	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
129	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
131	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
132	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
137	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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139	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
142	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
143	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
144	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
147	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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149	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
151	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
156	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
157	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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158	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
161	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
162	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
163	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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166	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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173	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
176	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
178	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
179	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

Test date	2015-08-05	Test Ambient:	25.1 ° C
Test Orientation	Horizontal	StabilizationTime(min)	90
Model Number	HC-T8-4FT-13W-ID(5000K, FROSTED)		

Electrical Measurement for Bare Lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE150813	120.0	60	0.1128	13.24	0.9785	13.67
-H3	277.0	60	0.0526	13.29	0.9126	15.59

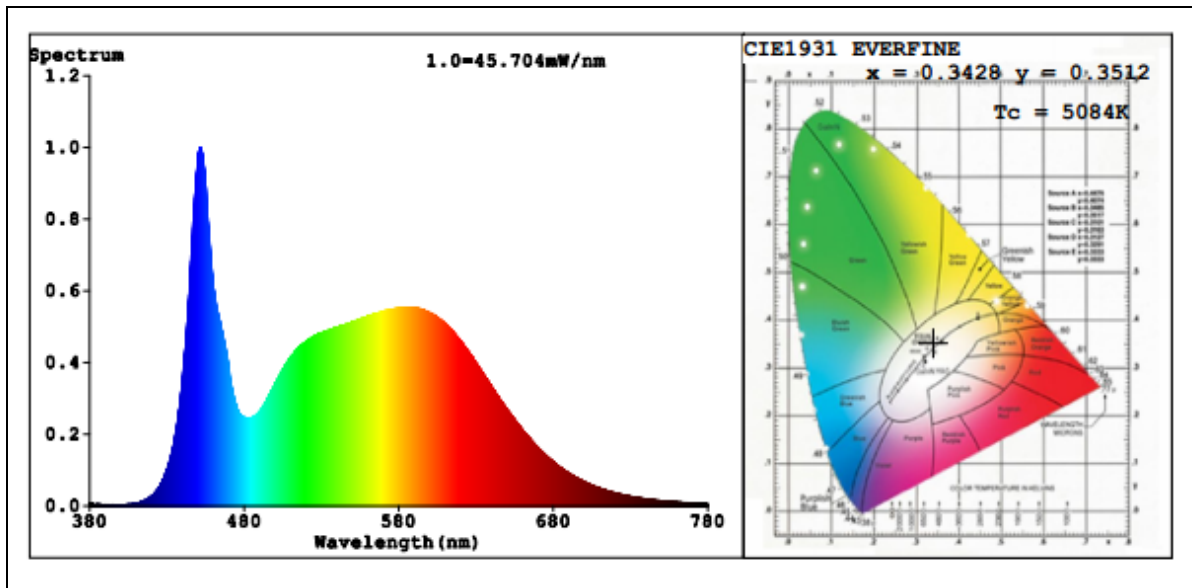
Sphere-Spectroradiometer Method for Bare Lamp:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	84	R9	17
Frequency (Hz)	60	R2	90	R10	76
Color Rendering Index (CRI)	85.1	R3	94	R11	84
R9	17	R4	85	R12	63
CCT (K)	5084	R5	85	R13	86
Chromaticity (x, y)	x=0.3428 y=0.3512	R6	86	R14	97
Chromaticity (u', v')	u'=0.2101 v'=0.4841	R7	88	R15	80
Duv	0.0007	R8	70	--	
Total Initial Lumen Output(lm)	1736.8				
Initial Lumen Efficacy(lm/w)	131.17				

Sphere-Spectroradiometer Method for 277V:

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Initial Lumen Output(lm)	1728.4
Initial Lumen Efficacy(lm/w)	130.05

Spectral Power Distribution & Chromaticity Diagram



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

Test date	2015-08-05	Test Ambient:	25.1 °C
Test Orientation	Horizontal	StabilizationTime(min)	90
Model Number	HC-T8-4FT-13W-ID(3000K, Clear)		

Electrical Measurement for Bare Lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE150813	120.0	60	0.1142	13.34	0.9737	13.44
-H4	277.0	60	0.0532	13.46	0.9136	15.46

Sphere-Spectroradiometer Method for Bare Lamp:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	15
Frequency (Hz)	60	R2	92	R10	81
Color Rendering Index (CRI)	84.1	R3	97	R11	81
R9	15	R4	82	R12	70
CCT (K)	3008	R5	83	R13	85
Chromaticity (x, y)	x=0.4371 y=0.4054	R6	90	R14	99
Chromaticity (u', v')	u'=0.2501 v'=0.5219	R7	84	R15	76
Duv	0.0005	R8	62	--	
Total Initial Lumen Output(lm)	1725.5				
Initial Lumen Efficacy(lm/w)	129.35				

Sphere-Spectroradiometer Method for 277V:

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Initial Lumen Output(lm)	1734.6
Initial Lumen Efficacy(lm/w)	128.87

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

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