



NVLAP LAB CODE 201011-0

Report No.: STD150803NB-AY

LM-79-08 Test Report

For

CEA GROUP INTERNATIONAL CO.,LTD

(Brand Name: CEA/EAEC)

Sanjiali Industrial Zone Zhucheng Road Panshi North baixiang Yueqing Zhejiang China

High-Bay Luminaires for Commercial and Industrial buildings

Model name(s): HBL3-150-DRHB410PC

Representative (Tested) Model: HBL3-150-DRHB410PC(2700K)
HBL3-150-DRHB410PC(5700K)

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

Test & Report By:

Johnson Sun

Engineer: Johnson Sun

Date: Mar.05, 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-C/2

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

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Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
HBL3-150-DRHB410PC(2700K)	2700K	14189	147.1	96.46
HBL3-150-DRHB410PC(3000K)	3000K	14318 ^{*1}	148.0 ^{*2}	96.74 ^{*3}
HBL3-150-DRHB410PC(3500K)	3500K	14446 ^{*1}	148.0 ^{*2}	97.61 ^{*3}
HBL3-150-DRHB410PC(4000K)	4000K	14575 ^{*1}	148.0 ^{*2}	98.48 ^{*3}
HBL3-150-DRHB410PC(4500K)	4500K	14704 ^{*1}	148.0 ^{*2}	99.35 ^{*3}
HBL3-150-DRHB410PC(5000K)	5000K	14832 ^{*1}	148.0 ^{*2}	100.22 ^{*3}
HBL3-150-DRHB410PC(5700K)	5700K	14961	148.9	100.48

*1: This value is calculated and the calculation formula is as below:

$$14318 = (14961 - 14189) / 6 + 14189$$

$$14446 = (14961 - 14189) / 6 + 14318$$

$$14575 = (14961 - 14189) / 6 + 14446$$

$$14704 = (14961 - 14189) / 6 + 14575$$

$$14832 = (14961 - 14189) / 6 + 14704$$

*2: This value is calculated and the calculation formula is as below:

$$148.0 = (148.9 + 147.1) / 2$$

*3: This value is calculated and the calculation formula is as below:

$$96.74 = 14318 / 148.0$$

$$97.61 = 14446 / 148.0$$

$$98.48 = 14575 / 148.0$$

$$99.35 = 14704 / 148.0$$

$$100.22 = 14832 / 148.0$$



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	Mar.05, 2016
Test Report No.	STD150803NB-AY
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	CEA GROUP INTERNATIONAL CO.,LTD	
Brand Name	CEA/EAEC	
Model Number	HBL3-150-DRHB410PC(2700K)	
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	s

Integrating Sphere**Goniophotometer****Electrical Measurements:****Output****Output**

Input Wattage	--	147.1	W
Input Current	--	1.2321	A
Input Voltage (ac)	--	120.0	V
Power Factor	--	0.9949	
Off-State Power	--	0	W

Photometric Characteristics

Total Initial Lumen Output	--	14189	lm
Initial Lumen Efficacy	--	96.46	lm/w
Correlated color temperature / CCT	2732		K
Color rendering index / CRI	80.4		
R9 Value	0		
Duv	-0.0012		
Luminous Intensity Distribution			
Center beam candlepower (if applicable)		6980	cd
Beam angle (if applicable)		78.5	°
Zonal lumens in the 0 °-60 ° zone		84.9	%
Zonal lumens in the 60 °-90 ° zone	-----	9.9	%
Zonal lumens in the 90 °-120 ° zone		2.7	%
Zonal lumens in the 120 °-180 ° zone		2.5	%

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

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Laboratory Information:

Name of Test Laboratory	Standard-Tech Co. Ltd
Date of Test Report	Mar.05, 2016
Test Report No.	STD150803NB-AY
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	CEA GROUP INTERNATIONAL CO.,LTD	
Brand Name	CEA/EAEC	
Model Number	HBL3-150-DRHB410PC(5700K)	
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	s

Integrating Sphere

Goniophotometer

Electrical Measurements:

Output

Output

Input Wattage	148.9	--	W
Input Current	1.2482	--	A
Input Voltage (ac)	120.0	--	V
Power Factor	0.9941	--	
Off-State Power	0	--	W

Photometric Characteristics

Total Initial Lumen Output	14961	--	lm
Initial Lumen Efficacy	100.48	--	lm/w
Correlated color temperature / CCT	5345	--	K
Color rendering index / CRI	83.9	--	
R9 Value	11	--	
Duv	0.0006	--	

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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Test Specifications:	
Date of Receipt	: 2016-03-01
Date of Test	: 2016-03-02
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 $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$, 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.

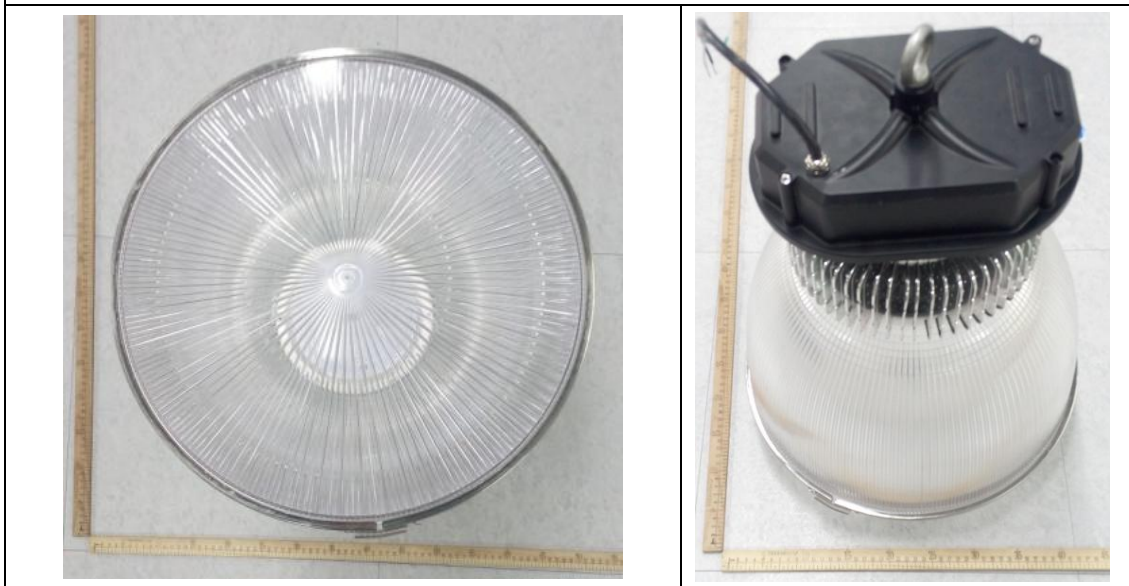
2. Photometric and Electrical Measurements – Integrating Sphere Method:

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. 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	CEA/EAEC
Model Number	HBL3-150-DRHB410PC
Luminaire Type	High-Bay Luminaires for Commercial and Industrial buildings
Rated Voltage / Frequency	100~ 277Vac, 50/60Hz
Nominal Power	150W
Rated Initial Lamp Lumen	--
Declared CCT	2700K,3000K,3500K,4000K,4500K,5000K,5700K
LED Manufacturer	SHENZHEN MTC LIGHTING CO., LTD.
LED Model	MTRC-3528WB
Sample Receipt Date	Mar.01, 2016
Sample Number	STD150803NB-AY1(2700K),AY2(5700K)

Photo



2.1 Electrical, Photometric and Chromaticity Measurements (Refer to Work Instruction QD25)	IES LM-79 2008
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Test date	2016-03-02	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	HBL3-150-DRHB410PC(2700K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD150803	120.0	60	1.2321	147.1	0.9949	10.02
NB-AY1	277.0	60	0.5606	143.7	0.9254	13.28

Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	80.4
R9	0
CCT (K)	2732
Chromaticity (x, y)	x=0.4552 y=0.4062
Chromaticity (u', v')	u'=0.2615 v'=0.5250
Duv	-0.0012

Special Color Rendering Indices			
R1	79	R9	0
R2	92	R10	79
R3	94	R11	76
R4	77	R12	74
R5	79	R13	81
R6	90	R14	97
R7	79	R15	70
R8	53	--	--

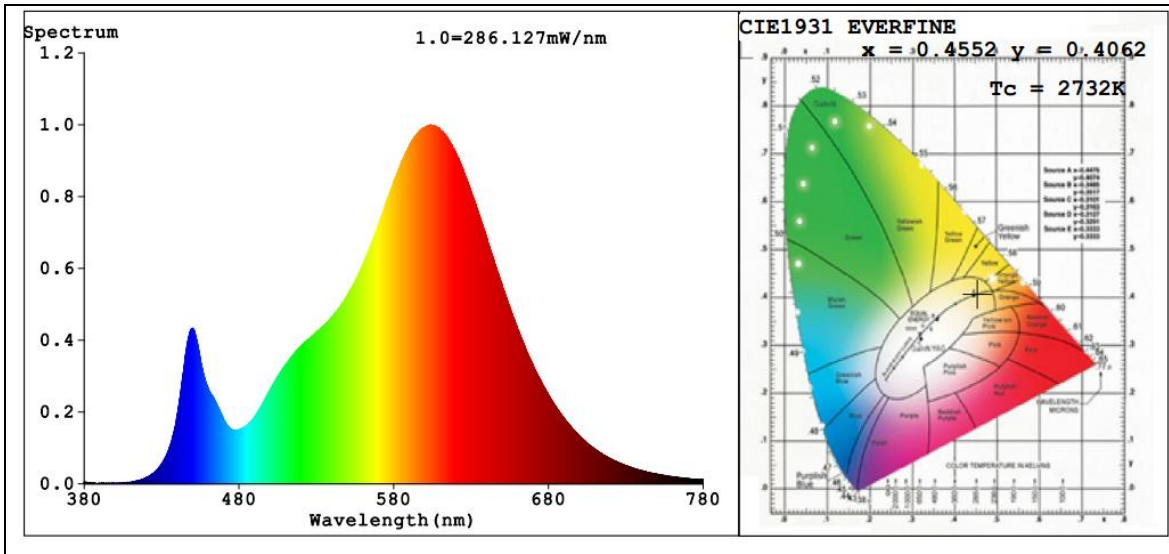
Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	14189
Luminous Efficacy (lm/W)	96.46
Beam Angle °	78.5
Center Beam Candle Power (cd)	6980

Goniophotometer Method:

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	14090
Luminous Efficacy (lm/W)	98.05

Spectral Power Distribution & Chromaticity Diagram



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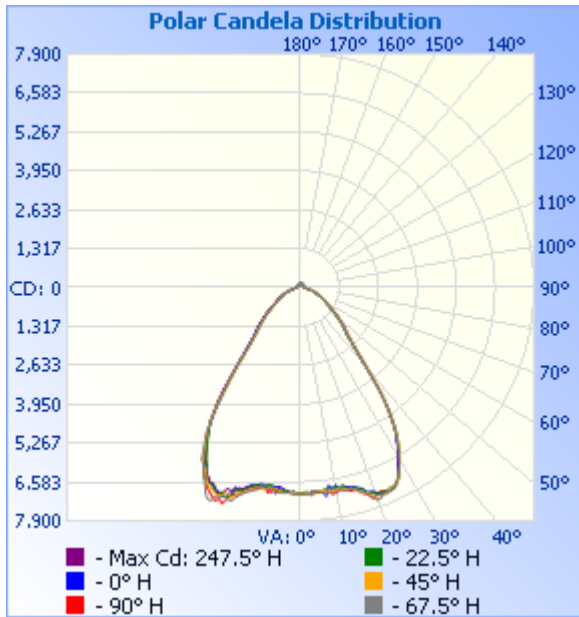
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Zonal Lumen Tabulation

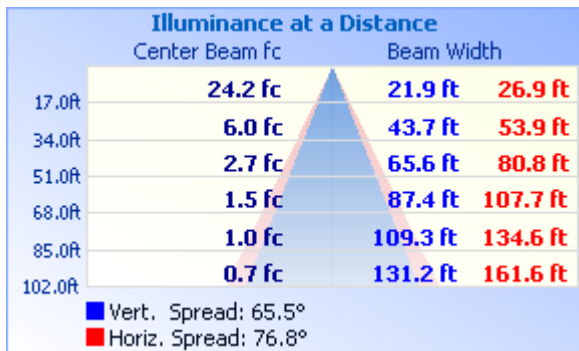
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	6,023.4	42.5%
0-40	9,145.9	64.5%
0-60	12,042.9	84.9%
60-90	1,407.8	9.9%
70-100	815.6	5.7%
90-120	379.4	2.7%
0-90	13,450.7	94.8%
90-180	737.1	5.2%
0-180	14,187.7	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	660.2	4.7%	90-100	150.5	1.1%
10-20	2,025.1	14.3%	100-110	128.5	0.9%
20-30	3,338.1	23.5%	110-120	100.4	0.7%
30-40	3,122.5	22.0%	120-130	101.3	0.7%
40-50	1,745.5	12.3%	130-140	86.6	0.6%
50-60	1,151.6	8.1%	140-150	65.5	0.5%
60-70	742.7	5.2%	150-160	51.6	0.4%
70-80	443.4	3.1%	160-170	40.8	0.3%
80-90	221.7	1.6%	170-180	11.8	0.1%

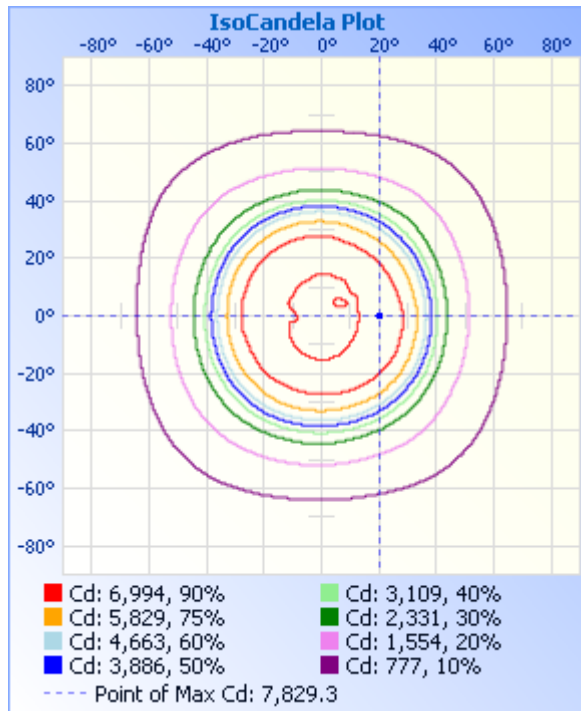
Photometric Data



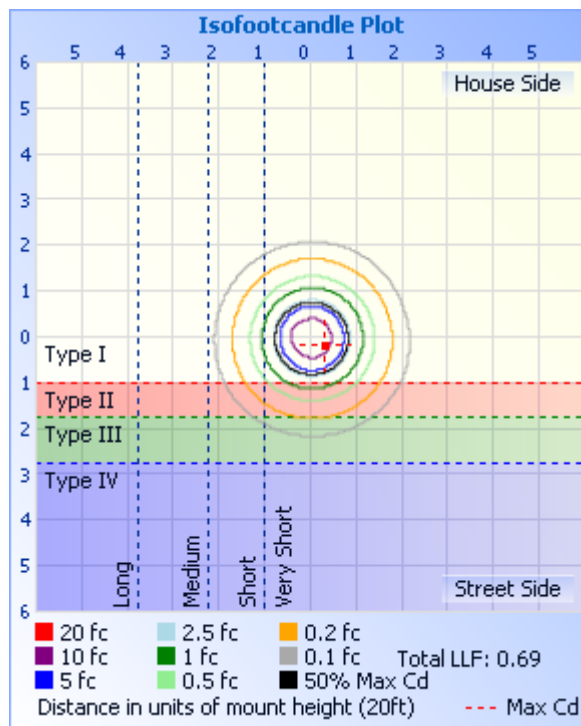
Illuminance Plots



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	6980	6980	6980	6980	6980	6980	6980	6980	6980	6980	6980	6980	6980	6980	6980	6980	6980
1	6956	6928	6983	7018	6971	6953	6947	6957	6968	6945	6970	6987	6972	6963	6941	6937	6956
2	6957	6931	6934	6972	6955	7008	6966	6964	6908	6968	6943	6998	6956	7022	6979	6975	6957
3	6923	6981	7011	7042	7018	7035	6965	6964	6952	6924	6937	6965	6942	6919	6944	6931	6923
4	6890	6882	6889	6906	6964	6927	6951	6874	6887	6891	6971	6943	6947	6956	6932	6924	6890
5	6903	6927	6924	6919	6956	6936	6925	6932	6836	6899	6948	6949	6946	6908	6955	6978	6903
6	6925	6907	6926	6987	6963	6941	6955	6840	6765	6895	6899	6988	6837	6891	6888	6849	6925
7	7105	6863	6896	7046	6901	7058	6872	6970	6810	6946	6858	6964	7023	6957	7077	6820	7105
8	6770	6882	6974	6856	7013	6949	6933	6750	6786	6769	6923	6816	6807	6912	6864	6990	6770
9	6899	6851	6930	7024	7066	6891	6753	6788	6768	6757	6833	6866	7036	7052	7083	6848	6899
10	6797	6876	6992	7002	7037	6971	6927	6781	6835	6791	6946	6880	6879	6889	6910	6861	6797
11	6921	6864	6892	6916	6962	6892	6844	6812	6769	6912	6904	6811	6878	6881	6858	6886	6921
12	6864	6854	6944	7017	6988	6943	6919	6833	6815	6846	6911	6935	6976	7001	6918	6882	6864
13	6918	6982	6997	7030	7016	7024	6981	6931	6857	6840	6949	7025	7003	7004	6984	6909	6918
14	6964	6999	7016	7001	7094	7069	7000	6900	6896	6971	7050	7095	7072	7007	7044	6938	6964
15	6980	7004	7034	7040	7063	7075	7056	7038	6973	7060	7113	7179	7117	7021	6978	6986	6980
16	7052	7093	7174	7146	7166	7173	7126	7088	7085	7162	7211	7258	7232	7172	7083	7099	7052
17	7106	7114	7254	7224	7275	7244	7183	7187	7168	7135	7238	7381	7386	7263	7114	7091	7106
18	7274	7289	7296	7335	7359	7306	7367	7377	7112	7275	7503	7593	7352	7380	7301	7183	7274
19	7309	7341	7402	7495	7533	7475	7452	7314	7395	7510	7424	7585	7497	7348	7265	7263	7309
20	7358	7406	7628	7650	7491	7543	7370	7303	7534	7528	7377	7521	7772	7460	7229	7237	7358
21	7466	7458	7615	7604	7406	7547	7349	7258	7542	7417	7525	7552	7667	7495	7307	7443	7466
22	7512	7460	7542	7522	7414	7601	7424	7411	7445	7553	7555	7623	7763	7487	7368	7524	7512
23	7460	7474	7544	7552	7520	7495	7471	7492	7382	7458	7497	7829	7667	7529	7386	7393	7460
24	7427	7516	7433	7510	7517	7464	7434	7526	7286	7339	7437	7797	7567	7399	7318	7268	7427
25	7422	7496	7401	7460	7468	7399	7342	7270	7283	7282	7394	7623	7466	7324	7191	7256	7422
26	7361	7390	7395	7381	7375	7223	7195	7189	7221	7256	7253	7392	7260	7132	7155	7123	7361
27	7263	7255	7294	7222	7265	7033	7071	6968	7033	7073	7060	7223	7172	7001	7015	7036	7263
28	7053	7101	7086	7124	7084	6928	6894	6825	6810	6770	6920	7012	7006	6840	6773	6900	7053

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29	6823	6901	6898	6895	6772	6688	6669	6582	6655	6586	6777	6804	6745	6674	6643	6655	6823
30	6625	6708	6725	6679	6633	6470	6523	6439	6459	6346	6574	6702	6485	6418	6442	6431	6625
31	6414	6476	6509	6477	6387	6374	6291	6329	6294	6146	6280	6369	6298	6188	6253	6240	6414
32	6137	6262	6270	6204	6190	6220	6038	6069	5989	5900	6059	6109	6048	5949	6013	5999	6137
33	5963	5989	5993	5982	5924	5799	5782	5811	5713	5726	5832	5814	5807	5619	5670	5719	5963
34	5665	5686	5694	5722	5633	5502	5465	5535	5387	5481	5423	5443	5416	5253	5304	5460	5665
35	5326	5335	5345	5406	5297	5144	5210	5167	5013	5042	5058	5038	5088	4913	4945	5105	5326
36	5025	5017	4988	4967	4959	4805	4750	4695	4558	4547	4657	4710	4754	4626	4620	4779	5025
37	4605	4666	4638	4578	4586	4493	4436	4370	4214	4095	4056	4159	4301	4232	4235	4369	4605
38	4140	4254	4257	4192	4212	4070	3959	3904	3821	3710	3689	3803	3840	3783	3870	3908	4140
39	3677	3688	3763	3738	3747	3591	3621	3560	3499	3382	3366	3453	3356	3347	3471	3484	3677
40	3262	3286	3304	3357	3431	3310	3283	3216	3177	3055	3043	3103	2999	3027	3141	3158	3262
41	2958	2972	3018	3068	3114	3029	2947	2875	2857	2730	2722	2755	2782	2788	2896	2883	2958
42	2723	2721	2760	2803	2802	2749	2718	2666	2654	2530	2500	2544	2543	2563	2676	2634	2723
43	2529	2516	2550	2607	2599	2564	2523	2494	2456	2332	2329	2355	2362	2373	2488	2427	2529
44	2340	2345	2394	2419	2431	2395	2355	2330	2302	2204	2186	2171	2207	2211	2328	2266	2340
45	2185	2200	2242	2261	2288	2270	2253	2195	2184	2087	2096	2049	2090	2098	2210	2145	2185
46	2085	2111	2147	2175	2197	2182	2155	2101	2097	2003	1994	1964	1993	2010	2102	2051	2085
47	1995	2019	2063	2084	2109	2087	2046	2019	2005	1909	1898	1864	1908	1927	2017	1957	1995
48	1899	1925	1963	1993	2011	1987	1944	1922	1905	1814	1804	1768	1813	1837	1913	1868	1899
49	1809	1821	1866	1896	1916	1888	1841	1824	1806	1717	1703	1672	1717	1744	1818	1776	1809
50	1704	1716	1764	1795	1814	1780	1737	1721	1698	1631	1613	1584	1636	1659	1720	1673	1704
51	1622	1634	1679	1696	1718	1685	1640	1625	1601	1542	1526	1501	1555	1573	1630	1596	1622
52	1540	1554	1595	1612	1624	1590	1546	1525	1511	1465	1447	1417	1475	1488	1539	1519	1540
53	1457	1473	1510	1529	1535	1494	1454	1435	1428	1375	1363	1329	1397	1405	1449	1438	1457
54	1379	1393	1430	1441	1453	1396	1362	1340	1339	1293	1283	1249	1315	1317	1364	1361	1379
55	1296	1308	1345	1357	1361	1308	1270	1252	1258	1209	1202	1172	1234	1239	1282	1283	1296
56	1218	1229	1259	1275	1281	1217	1187	1166	1175	1128	1127	1103	1161	1164	1210	1209	1218
57	1146	1154	1181	1198	1196	1138	1109	1088	1102	1060	1062	1044	1093	1093	1135	1137	1146
58	1077	1090	1113	1130	1118	1070	1049	1024	1033	999	1006	990	1031	1033	1072	1074	1077
59	1017	1026	1052	1072	1052	1009	995	969	983	951	958	945	980	980	1014	1016	1017
60	965	982	1001	1018	998	956	949	927	937	910	920	909	935	940	969	970	965

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61	925	942	961	977	949	903	909	888	894	872	881	871	898	904	929	929	925
62	886	904	922	937	903	859	866	850	850	833	841	836	863	869	892	886	886
63	845	866	882	897	860	812	823	808	804	790	800	798	826	832	852	847	845
64	804	828	836	854	810	767	779	766	758	746	758	761	786	794	812	805	804
65	761	784	795	809	763	721	735	723	711	705	714	721	745	755	772	763	761
66	718	740	744	764	714	679	690	683	665	663	673	682	703	714	731	721	718
67	678	692	698	715	673	636	648	646	622	626	635	644	667	676	692	680	678
68	640	649	655	670	628	596	613	609	584	591	600	610	632	641	657	644	640
69	602	611	615	626	588	560	579	577	551	560	568	581	601	611	625	610	602
70	573	577	578	594	554	531	553	550	524	534	543	556	575	586	596	582	573
71	547	547	545	563	526	506	525	523	497	511	517	532	551	561	571	557	547
72	522	520	518	534	499	479	497	494	470	485	489	504	523	536	544	533	522
73	495	490	491	504	467	452	469	466	440	454	462	477	497	511	518	506	495
74	469	458	461	475	438	424	439	438	410	428	438	450	471	485	490	480	469
75	442	426	430	443	406	396	406	408	381	397	407	420	442	456	461	453	442
76	413	397	397	405	373	367	374	377	350	368	379	392	414	427	432	422	413
77	381	366	363	367	336	335	339	342	324	339	347	362	381	395	401	393	381
78	347	332	329	330	301	302	306	309	296	309	314	334	352	362	368	359	347
79	315	301	299	294	269	272	274	281	270	282	287	308	325	332	337	328	315
80	286	275	270	264	244	252	249	257	250	261	265	288	303	310	312	302	286
81	266	254	248	243	226	233	233	241	235	246	250	270	285	292	292	279	266
82	248	236	230	227	210	221	222	226	220	232	237	255	271	278	276	263	248
83	233	222	215	214	196	206	207	212	207	216	221	237	254	262	259	245	233
84	221	210	203	203	188	194	194	199	196	201	204	222	236	242	242	228	221
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86	195	189	182	183	169	175	169	175	172	177	177	195	206	212	210	199	195
87	184	179	174	172	163	168	161	166	163	167	166	183	194	200	197	189	184
88	175	171	166	168	156	160	155	158	154	156	155	172	181	188	187	179	175
89	164	162	157	157	147	151	144	148	143	148	146	162	171	178	177	169	164
90	157	153	148	150	141	145	138	142	140	144	142	156	163	171	170	161	157
91	154	150	145	145	139	141	135	140	140	142	140	152	157	164	164	160	154
92	153	148	143	141	135	137	132	137	135	137	134	146	150	155	156	153	153

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93	145	142	136	135	129	132	128	132	131	135	132	142	146	148	148	145	145
94	140	138	133	131	128	130	129	132	133	136	134	143	145	146	143	140	140
95	141	138	134	132	130	133	132	135	137	138	138	146	146	148	144	142	141
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97	137	134	131	129	129	131	129	130	131	129	134	140	142	142	138	136	137
98	133	130	128	127	129	131	130	125	132	129	136	141	142	141	136	131	133
99	132	119	131	129	132	134	134	112	128	115	139	144	144	144	139	120	132
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101	107	103	132	131	134	135	132	103	106	108	137	142	142	142	135	104	107
102	105	105	129	129	132	133	130	110	106	115	136	141	141	141	132	107	105
103	107	117	128	129	133	134	129	117	113	121	135	141	141	140	129	117	107
104	119	119	127	129	133	134	124	117	120	121	131	140	140	140	125	119	119
105	120	119	123	128	132	133	117	115	118	119	123	136	136	136	117	118	120
106	115	114	115	124	128	128	112	112	115	115	117	133	133	132	113	113	115
107	113	111	109	121	125	125	109	111	113	113	114	130	131	129	110	111	113
108	112	110	106	119	124	124	108	110	112	112	112	128	129	126	109	110	112
109	111	109	105	117	122	122	108	109	111	110	110	125	127	123	108	109	111
110	108	106	104	114	120	117	108	106	109	107	109	121	124	118	108	106	108
111	106	102	103	110	117	113	107	104	107	103	108	117	120	115	107	103	106
112	103	99	103	107	113	110	107	102	104	101	107	113	116	112	106	100	103
113	101	97	102	104	110	108	106	97	102	96	105	110	112	109	104	97	101
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116	89	81	99	99	104	103	103	83	91	83	102	103	104	103	100	81	89
117	86	81	99	98	104	103	103	85	91	86	101	103	102	102	99	81	86
118	88	83	99	99	105	104	103	87	95	91	101	104	102	102	98	82	88
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123	117	111	102	114	117	113	103	115	126	121	103	113	112	109	98	104	117
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125	126	122	102	113	116	110	108	127	133	131	105	110	111	107	103	115	126
126	132	126	105	110	114	108	110	131	137	133	108	107	109	106	107	120	132
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132	121	129	116	96	106	98	121	132	121	132	121	97	106	100	122	125	121
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150	95	107	100	110	110	110	101	109	92	98	102	105	100	101	98	101	95
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153	100	109	104	113	111	111	100	114	101	105	112	105	105	104	106	108	100
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157	109	120	127	111	108	109	123	123	110	110	122	122	102	112	130	118	109
158	111	123	136	117	104	108	130	126	114	111	123	131	103	119	136	121	111
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161	116	126	155	139	116	123	154	151	117	108	136	153	119	142	152	126	116
162	119	130	160	148	126	130	161	157	122	114	142	156	126	148	155	125	119
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164	135	149	166	162	143	144	168	163	140	136	143	158	138	153	157	139	135
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166	142	150	167	165	153	151	165	164	141	139	140	155	138	153	156	139	142
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174	123	115	118	115	107	107	105	117	132	148	130	117	93	102	113	119	123
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179	93	99	113	114	119	119	112	106	92	101	104	109	113	114	110	91	93
180	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93



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2.3 Electrical, Photometric and Chromaticity Measurements (Refer to Work Instruction QD25)	IES LM-79 2008
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Test date	2016-03-02	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	HBL3-150-DRHB410PC(5700K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD150803	120.0	60	1.2482	148.9	0.9941	9.89
-AD2	277.0	60	0.5697	145.6	0.9227	13.03

Sphere-Spectroradiometer Method:

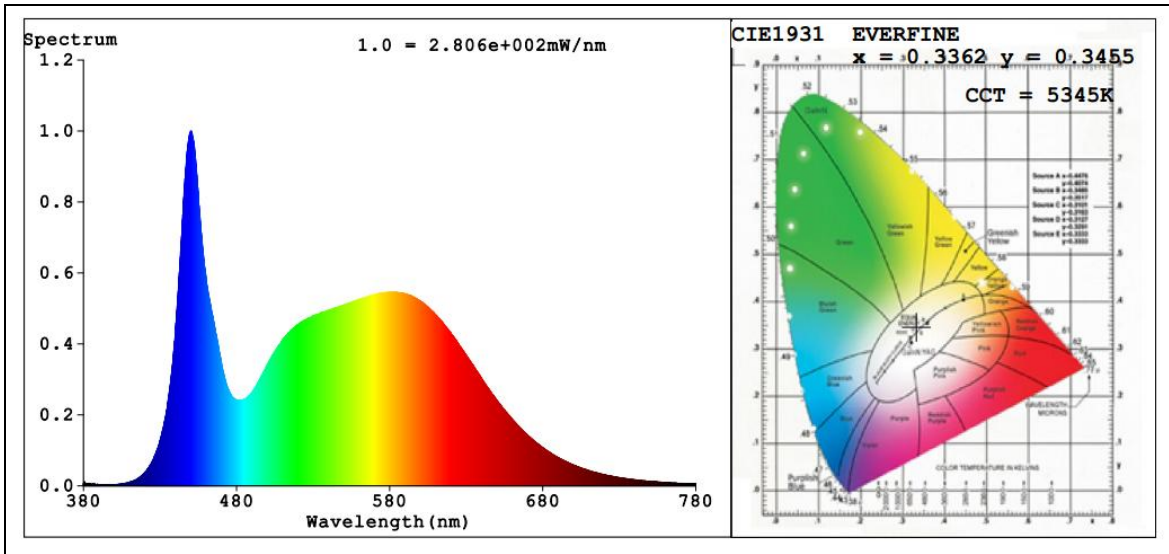
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	83.9
R9	11
CCT (K)	5345
Chromaticity (x, y)	x=0.3362 y=0.3455
Chromaticity (u', v')	u'=0.2077 v'=0.4803
Duv	0.0006
Total Initial Lumen Output(lm)	14961
Initial Lumen Efficacy(lm/w)	100.48

Special Color Rendering Indices			
R1	83	R9	11
R2	89	R10	73
R3	92	R11	83
R4	84	R12	63
R5	83	R13	84
R6	84	R14	96
R7	87	R15	78
R8	69	--	--

Sphere-Spectroradiometer Method for 277V:

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Initial Lumen Output(lm)	14863
Initial Lumen Efficacy(lm/w)	102.08

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 *******