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): HBL3-200-DRHB410PC

Representative (Tested) Model: HBL3-200-DRHB410PC(2700K)
HBL3-200-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.

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
HBL3-200-DRHB410PC(2700K)	2700K	18795	205.4	91.50
HBL3-200-DRHB410PC(3000K)	3000K	18994*1	206.5*2	91.98*3
HBL3-200-DRHB410PC(3500K)	3500K	19192*1	206.5*2	92.94*3
HBL3-200-DRHB410PC(4000K)	4000K	19391*1	206.5*2	93.90*3
HBL3-200-DRHB410PC(4500K)	4500K	19590*1	206.5*2	94.87*3
HBL3-200-DRHB410PC(5000K)	5000K	19788*1	206.5*2	95.83*3
HBL3-200-DRHB410PC(5700K)	5700K	19987	207.6	96.28

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

18994= (19987-18795) /6 +18795

19192= (19987-18795) /6 +18994

19391= (19987-18795) /6 +19192

19590= (19987-18795) /6 +19391

19788= (19987-18795) /6 +19590

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

206.5= (207.6+205.4) /2

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

91.98=18994/206.5

92.94=19192/206.5

93.90=19391/206.5

94.87=19590/206.5

95.83=19788/206.5

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-AZ
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	CEA GROUP INTERNATIONAL CO.,LTD	
Brand Name	CEA/EAEC	
Model Number	HBL3-200-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

Electrical Measurements:	**Integrating Sphere Output**	**Goniophotometer Output**	
Input Wattage	--	205.4	W
Input Current	--	1.7168	A
Input Voltage (ac)	--	120.0	V
Power Factor	--	0.9970	
Off-State Power	--	0	W
Photometric Characteristics			
Total Initial Lumen Output	--	18795	lm
Initial Lumen Efficacy	--	91.50	lm/w
Correlated color temperature / CCT	2765		K
Color rendering index / CRI	80.1		
R9 Value	0		
Duv	-0.0024		
Luminous Intensity Distribution			
Center beam candlepower (if applicable)	-----	9194	cd
Beam angle (if applicable)		78.4	°
Zonal lumens in the 0°-60°zone		84.9	%
Zonal lumens in the 60°-90°zone		10.1	%
Zonal lumens in the 90°-120°zone		2.7	%
Zonal lumens in the 120°-180°zone		2.3	%

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-AZ
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	CEA GROUP INTERNATIONAL CO.,LTD	
Brand Name	CEA/EAEC	
Model Number	HBL3-200-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

Electrical Measurements:	**Integrating Sphere Output**	**Goniophotometer Output**	
Input Wattage	207.6	--	W
Input Current	1.7373	--	A
Input Voltage (ac)	120.0	--	V
Power Factor	0.9958	--	
Off-State Power	0	--	W
Photometric Characteristics			
Total Initial Lumen Output	19987	--	lm
Initial Lumen Efficacy	96.28	--	lm/w
Correlated color temperature / CCT	5359	--	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			%

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 °C ±1 °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 ºC ±1 ºC. 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	HBL3-200-DRHB410PC
Luminaire Type	High-Bay Luminaires for Commercial and Industrial buildings
Rated Voltage / Frequency	100~ 277Vac, 50/60Hz
Nominal Power	200W
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-AZ1(2700K),AZ2(5700K)

Photo

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

Test date	2016-03-02	**Test Ambient:**	25.2 °C
Test Orientation	As intended	**Stabilization Time (min)**	90
Model Number	HBL3-200-DRHB410PC(2700K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD150803	120.0	60	1.7168	205.4	0.9970	11.43
NB-AZ1	277.0	60	0.7630	198.7	0.9401	14.25

Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	80.1
R9	0
CCT (K)	2765
Chromaticity (x, y)	x=0.4506 y=0.4019
Chromaticity (u', v')	u'=0.2604 v'=0.5226
Duv	-0.0024

Special Color Rendering Indices			
R1	79	R9	0
R2	92	R10	81
R3	94	R11	74
R4	76	R12	74
R5	78	R13	81
R6	91	R14	97
R7	79	R15	70
R8	52	--	--

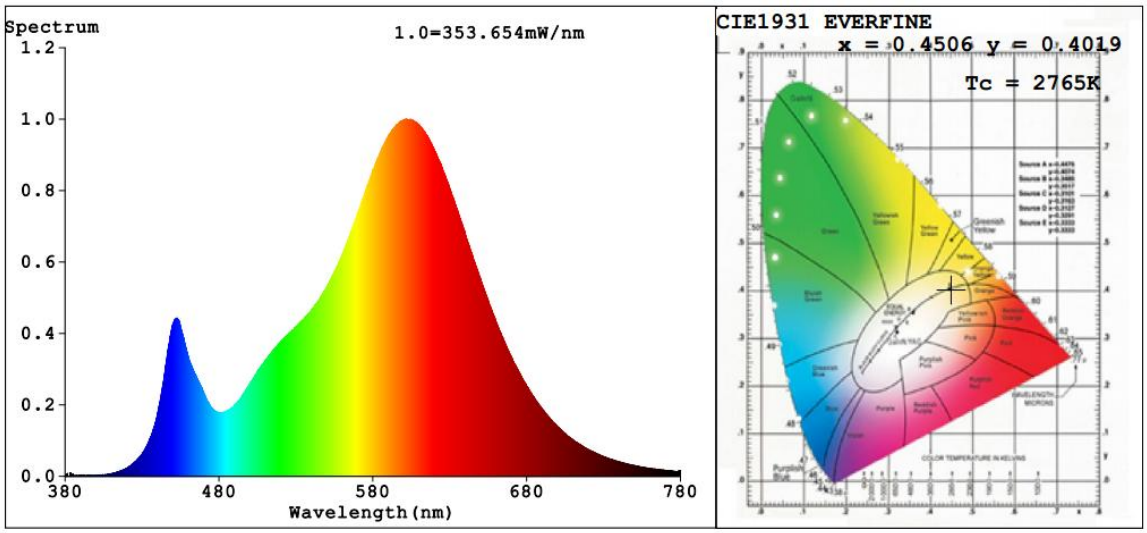
Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	18795
Luminous Efficacy (lm/W)	91.50
Beam Angle °	78.4
Center Beam Candle Power (cd)	9194

Goniophotometer Method:

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	18272
Luminous Efficacy (lm/W)	91.95

Spectral Power Distribution & Chromaticity Diagram

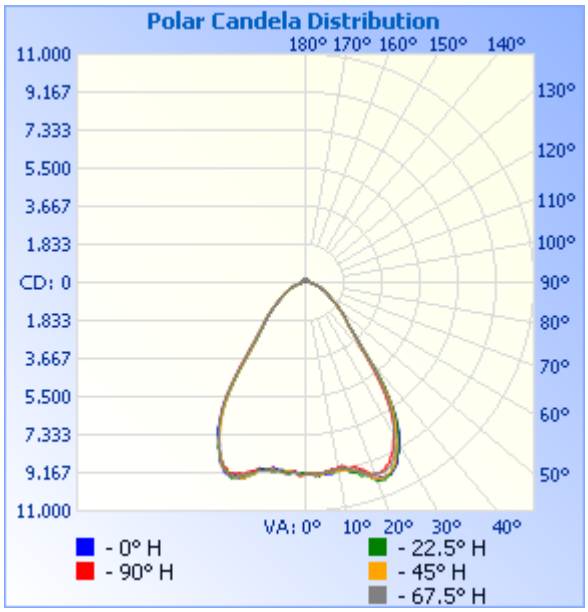


Zonal Lumen Tabulation

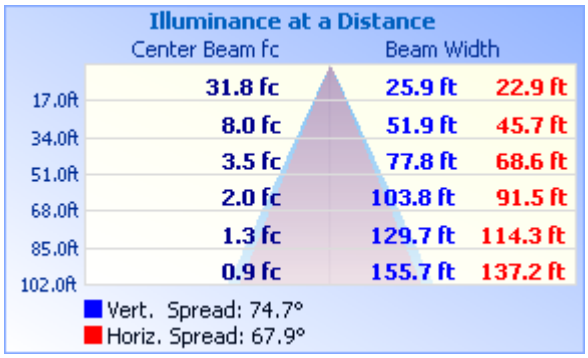
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	7,957.4	42.3%
0-40	12,072.3	64.2%
0-60	15,947.7	84.9%
60-90	1,901.3	10.1%
70-100	1,104.2	5.9%
90-120	505.8	2.7%
0-90	17,849.0	95%
90-180	944.4	5%
0-180	18,793.4	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	873.9	4.6%	90-100	201.6	1.1%
10-20	2,689.9	14.3%	100-110	168.1	0.9%
20-30	4,393.6	23.4%	110-120	136.1	0.7%
30-40	4,114.9	21.9%	120-130	140.8	0.7%
40-50	2,332.8	12.4%	130-140	113.6	0.6%
50-60	1,542.6	8.2%	140-150	71.1	0.4%
60-70	998.6	5.3%	150-160	53.3	0.3%
70-80	600.0	3.2%	160-170	46.4	0.2%
80-90	302.6	1.6%	170-180	13.3	0.1%

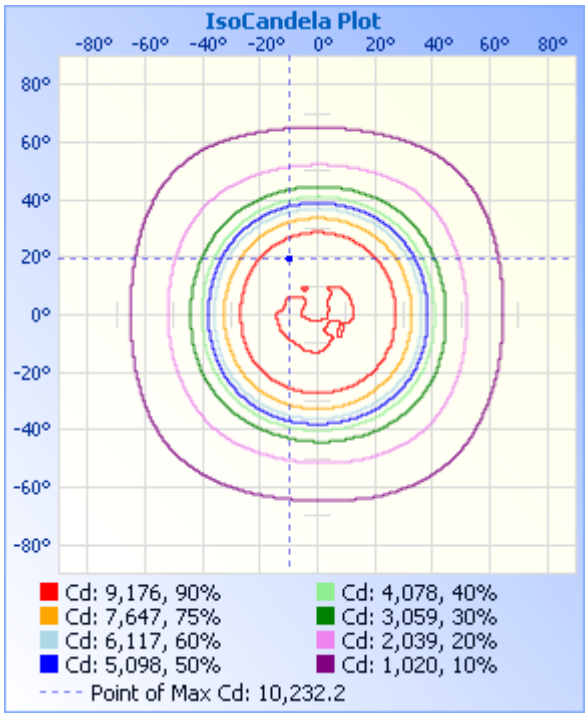
Photometric Data



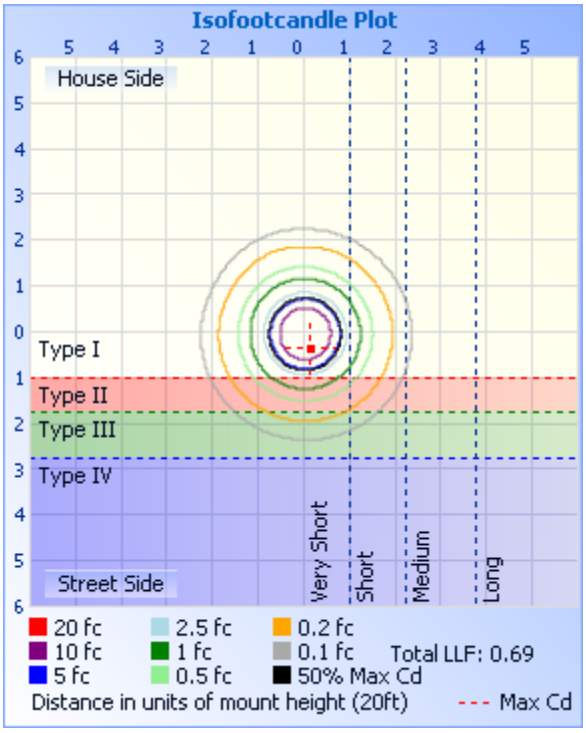
Illuminance Plots



ISOCANDELA DIAGRAM



ISOLUX DIAGRAM



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	9194	9194	9194	9194	9194	9194	9194	9194	9194	9194	9194	9194	9194	9194	9194	9194	9194
1	9216	9192	9217	9223	9195	9115	9263	9341	9158	9156	9338	9290	9264	9193	9152	9200	9216
2	9225	9208	9214	9238	9161	9277	9188	9233	9226	9212	9189	9229	9312	9158	9260	9149	9225
3	9156	9174	9216	9377	9322	9139	9147	9229	9111	9189	9157	9136	9094	9280	9314	9250	9156
4	9280	9368	9251	9198	9167	9184	9178	9111	9140	9165	9125	9193	9098	9109	9125	9185	9280
5	9175	9217	9266	9200	9203	9086	9112	9066	9141	9239	9089	9276	9095	9138	9143	9153	9175
6	9292	9207	9217	9166	9141	9080	9084	9137	9123	9198	9129	9257	9168	9141	9143	9229	9292
7	9255	9188	9155	9124	9142	9098	9102	9099	9105	9100	9223	9214	9157	9196	9097	9184	9255
8	9288	9223	9209	9156	9048	9086	9003	9061	9130	9134	9166	9184	9130	9154	9110	9232	9288
9	9141	9205	9172	9118	9119	9031	9032	8948	9068	9211	9142	9168	9109	9144	9149	9172	9141
10	9180	9213	9230	9095	9028	9128	9003	9039	9041	9185	9111	9287	9053	9016	9083	9165	9180
11	9209	9136	9174	9043	8984	9097	9063	9072	9171	9212	9221	9180	9154	9085	9153	9150	9209
12	9146	9154	9249	9113	9044	9059	9125	9183	9154	9177	9230	9244	9181	9151	9124	9225	9146
13	9223	9350	9240	9222	9185	8964	9226	9169	9190	9272	9314	9298	9203	9228	9120	9296	9223
14	9368	9427	9324	9289	9190	9240	9340	9268	9248	9266	9329	9304	9199	9260	9270	9309	9368
15	9407	9443	9342	9299	9144	9305	9368	9401	9490	9542	9518	9438	9357	9402	9250	9372	9407
16	9409	9683	9479	9480	9319	9384	9417	9462	9578	9654	9621	9552	9445	9504	9399	9475	9409
17	9587	9694	9597	9599	9418	9496	9544	9613	9793	9741	9789	9606	9534	9524	9493	9621	9587
18	9767	9765	9754	9666	9586	9647	9698	9860	9926	9880	9926	9746	9701	9723	9697	9762	9767
19	9955	9972	9981	9780	9763	9768	9785	9869	9958	9864	9914	9775	9701	9798	9819	9960	9955
20	10033	10185	10025	9790	9791	9803	9880	9985	9838	9995	9916	9959	9792	9809	9854	10013	10033
21	10042	10176	10092	9823	9851	9768	9952	9923	10042	10063	9952	9901	9820	9845	9918	10044	10042
22	10111	10232	10114	9862	9799	9913	9853	9963	9968	9893	9955	9993	9916	9906	9902	10059	10111
23	10043	10132	10048	9871	9763	9828	9897	9860	9955	9855	9820	9850	9709	9909	9972	10103	10043
24	10097	10097	10000	9758	9612	9784	9714	9852	9775	9695	9786	9776	9696	9803	9825	10037	10097
25	9983	9882	9909	9746	9563	9689	9730	9638	9628	9647	9583	9526	9502	9692	9795	9927	9983
26	9867	9829	9767	9549	9339	9513	9445	9354	9453	9313	9330	9427	9392	9537	9651	9808	9867
27	9727	9615	9567	9420	9209	9221	9252	9160	9129	9120	9177	9166	9114	9277	9432	9687	9727
28	9426	9397	9291	9135	8988	9045	8861	9004	8823	8991	8830	8870	8895	9030	9139	9332	9426

29	9304	9238	9016	8824	8706	8817	8689	8722	8616	8592	8563	8632	8585	8714	8993	9146	9304
30	9011	8946	8817	8538	8504	8459	8514	8328	8430	8363	8239	8309	8340	8511	8670	8856	9011
31	8763	8689	8453	8259	8255	8210	8196	8098	8187	8089	7931	8079	8093	8237	8468	8589	8763
32	8488	8364	8186	7972	7969	7866	7912	7841	7713	7695	7634	7758	7757	7896	8104	8309	8488
33	8105	8056	7909	7690	7629	7478	7571	7508	7408	7290	7282	7436	7454	7595	7807	7959	8105
34	7723	7721	7535	7293	7236	7122	7100	6994	7019	6876	6896	7070	7073	7221	7432	7557	7723
35	7289	7254	7219	6935	6794	6696	6695	6526	6469	6424	6427	6618	6610	6760	7020	7152	7289
36	6825	6769	6722	6444	6327	6263	6207	6095	5948	5855	5951	6108	6135	6332	6578	6670	6825
37	6336	6364	6222	5987	5812	5699	5639	5517	5423	5318	5420	5577	5604	5770	6071	6191	6336
38	5795	5833	5684	5435	5298	5193	5048	4937	4825	4751	4829	5025	5116	5287	5501	5686	5795
39	5278	5214	5090	4874	4768	4609	4430	4346	4318	4264	4339	4550	4573	4723	4887	5034	5278
40	4668	4592	4519	4374	4251	4142	4007	3912	3913	3930	3990	4165	4185	4263	4351	4499	4668
41	4179	4147	4086	3942	3937	3804	3655	3583	3584	3634	3682	3825	3832	3920	3977	4138	4179
42	3855	3811	3723	3681	3645	3539	3410	3354	3370	3423	3456	3568	3513	3583	3686	3734	3855
43	3570	3443	3430	3425	3412	3319	3165	3125	3156	3211	3231	3363	3274	3323	3418	3416	3570
44	3252	3198	3171	3154	3178	3100	2922	2898	2945	3002	3007	3157	3059	3072	3158	3208	3252
45	3008	2968	2964	2961	2948	2883	2779	2763	2837	2885	2882	2952	2898	2906	2984	2987	3008
46	2836	2795	2807	2812	2817	2738	2645	2642	2711	2758	2776	2826	2770	2783	2846	2833	2836
47	2729	2682	2695	2724	2723	2614	2532	2514	2563	2616	2644	2687	2639	2638	2731	2712	2729
48	2602	2571	2571	2585	2596	2491	2409	2391	2437	2502	2519	2566	2498	2505	2617	2600	2602
49	2481	2458	2450	2467	2465	2355	2271	2250	2291	2368	2378	2416	2355	2378	2488	2467	2481
50	2361	2342	2344	2355	2342	2223	2170	2131	2168	2226	2249	2280	2231	2248	2365	2343	2361
51	2223	2219	2219	2248	2223	2099	2066	2020	2056	2107	2139	2152	2114	2129	2244	2215	2223
52	2112	2087	2109	2127	2103	1993	1957	1913	1944	1995	2013	2014	1988	2019	2131	2102	2112
53	2008	1993	2002	2013	1986	1888	1853	1810	1839	1885	1895	1889	1880	1909	2013	1996	2008
54	1894	1882	1889	1892	1869	1782	1739	1705	1719	1776	1769	1764	1757	1794	1902	1882	1894
55	1792	1787	1780	1770	1752	1681	1633	1603	1615	1669	1672	1648	1657	1683	1784	1777	1792
56	1682	1674	1686	1670	1642	1581	1529	1503	1521	1571	1561	1541	1564	1586	1673	1667	1682
57	1589	1578	1591	1570	1536	1488	1439	1418	1438	1482	1462	1444	1471	1488	1577	1570	1589
58	1497	1482	1497	1470	1449	1399	1357	1349	1362	1402	1376	1359	1392	1399	1481	1473	1497
59	1414	1400	1411	1385	1371	1327	1288	1290	1308	1339	1314	1286	1320	1328	1398	1387	1414
60	1342	1324	1342	1314	1301	1270	1233	1239	1252	1285	1254	1221	1262	1270	1325	1315	1342

61	1279	1261	1282	1256	1249	1217	1184	1187	1200	1229	1199	1161	1212	1219	1264	1252	1279
62	1221	1207	1228	1208	1200	1166	1132	1136	1141	1172	1141	1102	1159	1168	1207	1197	1221
63	1169	1157	1177	1158	1152	1111	1079	1082	1084	1116	1079	1042	1096	1113	1150	1144	1169
64	1111	1104	1127	1108	1101	1058	1025	1026	1025	1056	1014	983	1035	1058	1088	1085	1111
65	1056	1053	1076	1057	1047	1003	970	967	966	995	950	927	977	1002	1026	1028	1056
66	999	1001	1021	1006	992	947	918	905	902	935	891	869	916	944	960	975	999
67	943	948	966	953	941	896	870	849	850	874	831	816	864	889	899	914	943
68	887	896	914	901	893	849	822	801	799	821	781	765	815	841	844	862	887
69	838	847	867	857	851	805	781	758	756	777	739	723	775	800	793	815	838
70	791	806	823	816	810	771	743	721	714	739	699	689	740	763	752	771	791
71	752	768	786	782	774	737	709	685	677	698	656	655	704	732	716	735	752
72	721	736	755	752	741	703	673	645	636	654	618	619	667	695	681	704	721
73	685	701	720	716	702	669	636	601	599	612	578	583	626	653	647	670	685
74	650	665	682	682	667	634	602	559	554	567	536	545	584	617	604	637	650
75	615	628	647	648	629	597	561	517	510	519	490	504	542	582	567	599	615
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2.3 Electrical, Photometric and Chromaticity Measurements *(Refer to Work Instruction QD25)*	**IES LM-79 2008**

Test date	2016-03-02	**Test Ambient:**	25.2 ºC
Test Orientation	As intended	**Stabilization Time (min)**	90
Model Number	HBL3-200-DRHB410PC(5700K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD150803 -AD2	120.0	60	1.7373	207.6	0.9958	11.26
	277.0	60	0.7630	198.7	0.9401	14.09

Sphere-Spectroradiometer Method:

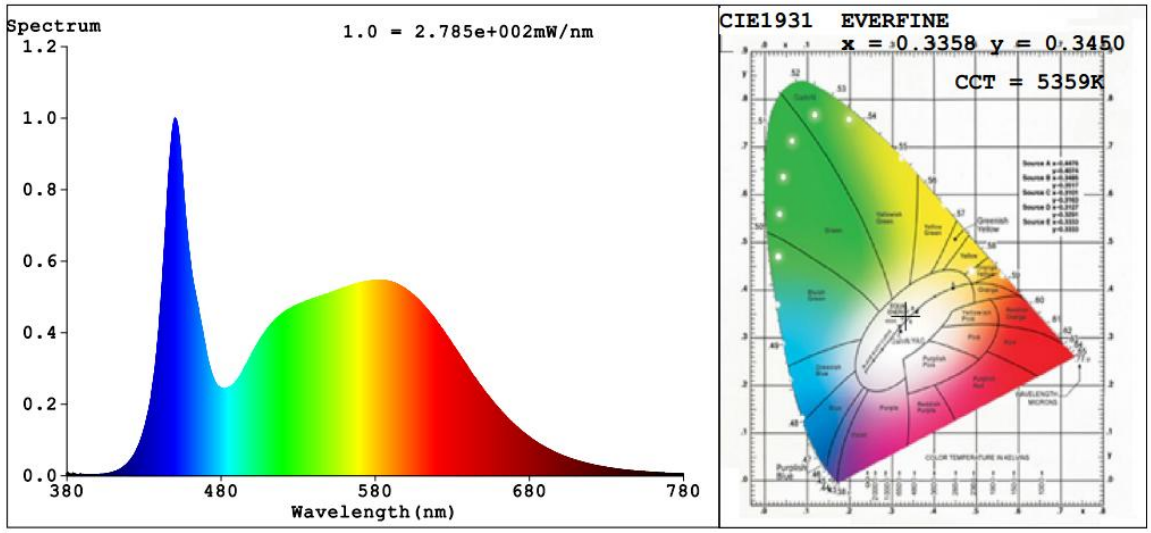
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	83.9
R9	11
CCT (K)	5359
Chromaticity (x, y)	x=0.3358 y=0.3450
Chromaticity (u', v')	u'=0.2076 v'=0.4800
Duv	0.0006
Total Initial Lumen Output(lm)	19987
Initial Lumen Efficacy(lm/w)	96.28

Special Color Rendering Indices			
R1	83	R9	11
R2	89	R10	73
R3	92	R11	83
R4	84	R12	63
R5	84	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)	19469
Initial Lumen Efficacy(lm/w)	97.98

Spectral Power Distribution & Chromaticity Diagram



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%			

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