



Report No.:GZE161532-A

NVLAP LAB CODE 201011-0

LM-79-08 Test Report

For

IKIO LED LIGHTING

(Brand Name: IKIO)

8470 Allison Pointe Blvd, Suite 128
Indianapolis, IN 46250

Direct Linear Ambient Luminaires

Model name(s): IK-ST04-0040-XX-J

Representative (Tested) Model: IK-ST04-0040-30-J
IK-ST04-0040-35-J
IK-ST04-0040-40-J
IK-ST04-0040-50-J

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

Test & Report By:

Johnson Sun

Engineer: Johnson Sun

Date: May.19,2016

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-A/2

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

Tel: 8620-3229 0320

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<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	May.19,2016
Test Report No.	GZE161532-A
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	IKIO LED LIGHTING	
Brand Name	IKIO	
Model Number	IK-ST04-0040-30-J	
SKU (if available)	N/A	
Type of Luminaire(for integral lamps, list base TYPE Bnd lamp type)	Direct Linear Ambient Luminaires	
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	--	40.01	W
Input Current	--	0.3409	A
Input Voltage (ac)	--	120.0	V
Power Factor	--	0.9781	
Off-State Power	--	0	W

Photometric Characteristics

Total Initial Lumen Output	--	5122.3	lm
Initial Lumen Efficacy	--	128.03	lm/w
Correlated color temperature / CCT	2996	--	K
Color rendering index / CRI	82.4	--	
R9 Value	7	--	
Duv	0.0014	--	
Luminous Intensity Distribution			
Center beam candlepower (if applicable)		1382	cd
Beam angle (if applicable)		121.3	°
Zonal lumens in the 0°-60° zone		61.7	%
Zonal lumens in the 60°-90° zone	-----	27.3	%
Zonal lumens in the 90°-120° zone		7.8	%
Zonal lumens in the 120°-180° zone		3.2	%

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Test Report No.	GZE161532-A
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	IKIO LED LIGHTING	
Brand Name	IKIO	
Model Number	IK-ST04-0040-35-J	
SKU (if available)	N/A	
Type of Luminaire(for integral lamps, list base TYPE Bnd lamp type)	Direct Linear Ambient Luminaires	
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	39.86	--	W
Input Current	0.3370	--	A
Input Voltage (ac)	120.0	--	V
Power Factor	0.9856	--	
Off-State Power	0	--	W

Photometric Characteristics

Total Initial Lumen Output	5271	--	lm
Initial Lumen Efficacy	132.24	--	lm/w
Correlated color temperature / CCT	3494	--	K
Color rendering index / CRI	84.4	--	
R9 Value	15	--	
Duv	0.0000	--	
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 Report No.	GZE161532-A
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	IKIO LED LIGHTING	
Brand Name	IKIO	
Model Number	IK-ST04-0040-40-J	
SKU (if available)	N/A	
Type of Luminaire(for integral lamps, list base TYPE Bnd lamp type)	Direct Linear Ambient Luminaires	
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	40.33	--	W
Input Current	0.3406	--	A
Input Voltage (ac)	120.0	--	V
Power Factor	0.9868	--	
Off-State Power	0	--	W

Photometric Characteristics

Total Initial Lumen Output	5389	--	lm
Initial Lumen Efficacy	133.62	--	lm/w
Correlated color temperature / CCT	3940	--	K
Color rendering index / CRI	85.5	--	
R9 Value	21	--	
Duv	-0.0002	--	
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	May.19,2016
Test Report No.	GZE161532-A
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	IKIO LED LIGHTING	
Brand Name	IKIO	
Model Number	IK-ST04-0040-50-J	
SKU (if available)	N/A	
Type of Luminaire(for integral lamps, list base TYPE Bnd lamp type)	Direct Linear Ambient Luminaires	
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	39.98	--	W
Input Current	0.3380	--	A
Input Voltage (ac)	120.0	--	V
Power Factor	0.9857	--	
Off-State Power	0	--	W

Photometric Characteristics

Total Initial Lumen Output	5399	--	lm
Initial Lumen Efficacy	135.04	--	lm/w
Correlated color temperature / CCT	5110	--	K
Color rendering index / CRI	85.3	--	
R9 Value	13	--	
Duv	-0.0001	--	
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	: May.05,2016
Date of Test	: May.07,2016
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 $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$, 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 ° Vertical 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.

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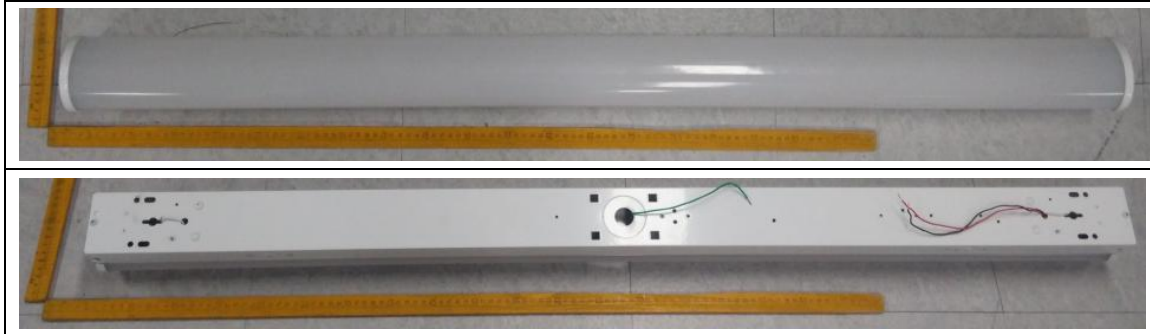
Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

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

1. Product Information:

Brand Name	IKIO
Model Number	IK-ST04-0040-XX-J
Luminaire Type	Direct Linear Ambient Luminaires
Rated Voltage / Frequency	100 ~ 277 Vac, 50/60 Hz
Nominal Power	36W
Rated Initial Lamp Lumen	--
Declared CCT	3000K,3500K,4000K,5000K
LED Manufacturer	EVERLIGHT ELECTRONICS CO.,LTD
LED Model	62-217D
Sample Receipt Date	May.05,2016
Sample Number	GZE161532-A1(3000K),A2(3500K),A3(4000K),A4(5000K)

Photo



2.1 Electrical, Photometric and Chromaticity Measurements
 (Refer to Work Instruction QD25)

IES LM-79 2008

Test date	2016-05-07	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-ST04-0040-30-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161532	120.0	60	0.3409	40.01	0.9781	12.85
-A1	277.0	60	0.1608	40.10	0.9001	18.34

Integrating Sphere Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	82.4
R9	7
CCT (K)	2996
Chromaticity (x, y)	x=0.4393 y=0.4083
Chromaticity (u', v')	u'=0.2502 v'=0.5234
Duv	0.0014

Special Color Rendering Indices			
R1	80	R9	7
R2	90	R10	78
R3	97	R11	80
R4	81	R12	72
R5	81	R13	82
R6	88	R14	99
R7	83	R15	73
R8	59	--	--

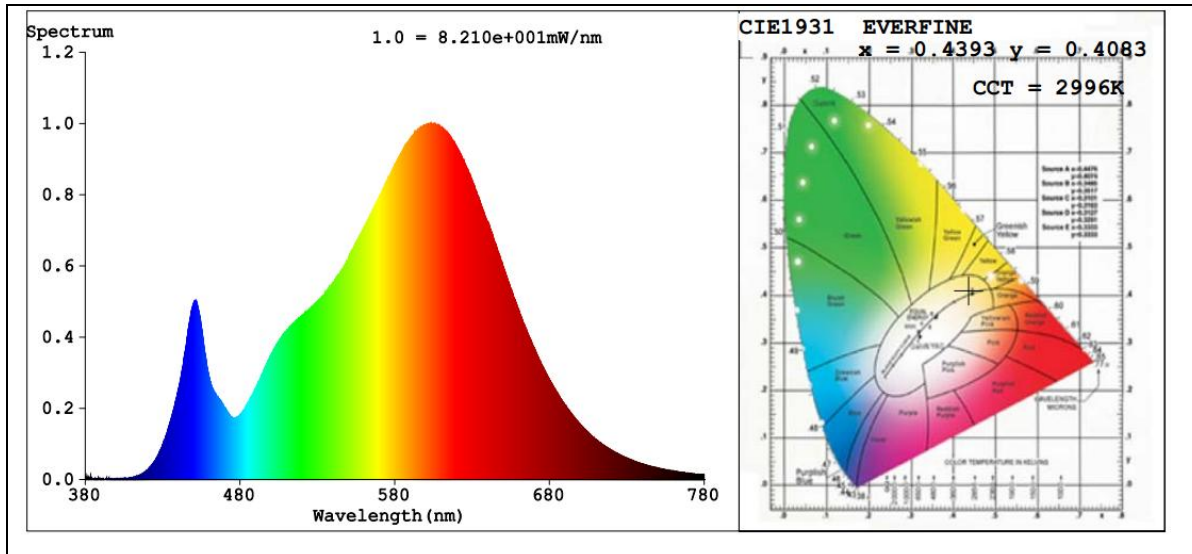
Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	5122.3
Luminous Efficacy (lm/W)	128.03
Beam Angle °	121.3
Center Beam Candle Power (cd)	1382

Goniophotometer Method:

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	5105.3
Luminous Efficacy (lm/W)	127.31

Spectral Power Distribution & Chromaticity Diagram



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Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,069.7	20.9%
0-40	1,753.8	34.2%
0-60	3,161.0	61.7%
60-90	1,396.5	27.3%
70-100	1,030.2	20.1%
90-120	397.0	7.8%
0-90	4,557.5	89%
90-180	564.0	11%
0-180	5,121.5	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	130.7	2.6%	90-100	225.5	4.4%
10-20	373.6	7.3%	100-110	70.1	1.4%
20-30	565.4	11.0%	110-120	101.5	2%
30-40	684.0	13.4%	120-130	71.8	1.4%
40-50	721.9	14.1%	130-140	46.6	0.9%
50-60	685.3	13.4%	140-150	26.3	0.5%
60-70	591.8	11.6%	150-160	14.5	0.3%
70-80	466.1	9.1%	160-170	5.7	0.1%
80-90	338.6	6.6%	170-180	2.2	0%

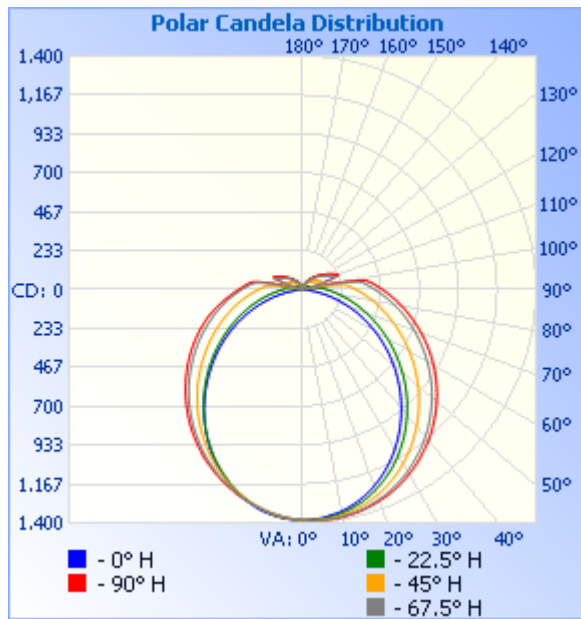
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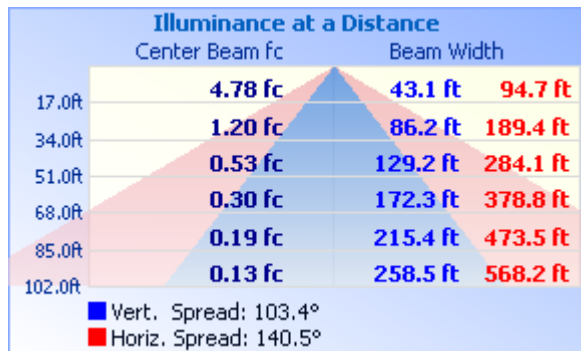
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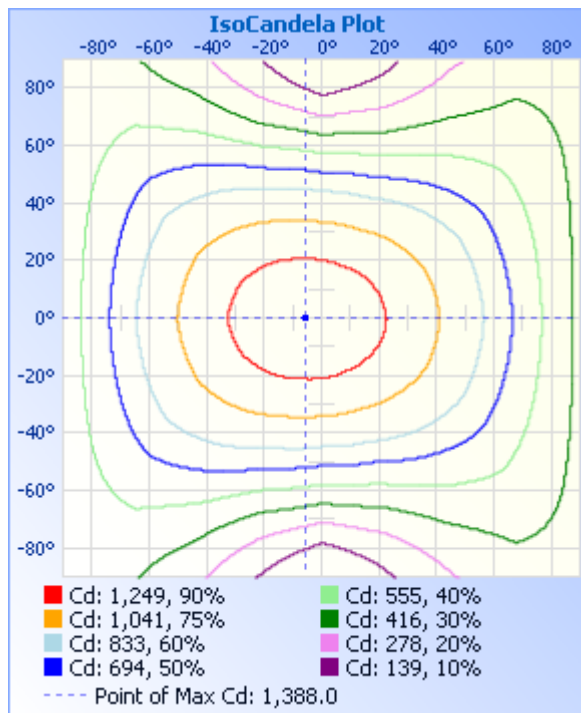
Photometric Data



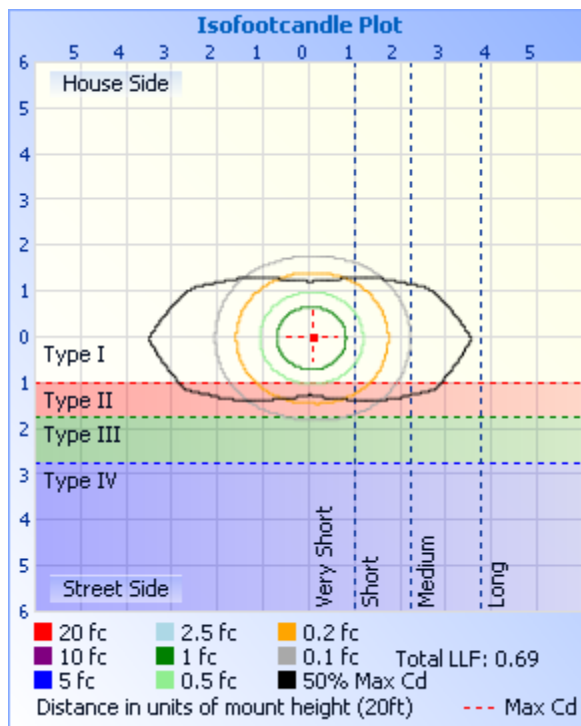
Illuminance Plots



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	1382	1382	1382	1382	1382	1382	1382	1382	1382	1382	1382	1382	1382	1382	1382	1382	1382
1	1382	1383	1385	1384	1384	1384	1383	1382	1383	1381	1382	1379	1380	1381	1380	1381	1382
2	1381	1383	1385	1386	1386	1385	1384	1382	1382	1379	1379	1378	1378	1377	1378	1379	1381
3	1379	1382	1386	1386	1387	1386	1384	1382	1380	1377	1375	1375	1374	1375	1375	1376	1379
4	1376	1381	1386	1387	1387	1386	1384	1380	1378	1374	1372	1371	1370	1371	1372	1373	1376
5	1374	1378	1385	1387	1388	1386	1384	1378	1375	1371	1368	1367	1367	1367	1369	1368	1374
6	1369	1376	1384	1387	1388	1386	1382	1376	1370	1367	1364	1363	1362	1363	1364	1364	1369
7	1364	1373	1382	1386	1388	1385	1380	1372	1367	1361	1359	1358	1358	1358	1361	1359	1364
8	1360	1370	1379	1385	1387	1384	1379	1368	1362	1356	1354	1353	1352	1354	1355	1354	1360
9	1355	1366	1376	1384	1386	1384	1375	1364	1357	1349	1348	1347	1347	1348	1350	1348	1355
10	1349	1360	1373	1381	1386	1381	1372	1358	1350	1343	1341	1341	1342	1343	1343	1341	1349
11	1343	1355	1369	1378	1382	1377	1368	1353	1343	1336	1333	1334	1335	1335	1337	1334	1343
12	1335	1349	1364	1376	1380	1375	1364	1347	1335	1328	1327	1328	1329	1327	1329	1325	1335
13	1326	1342	1360	1373	1378	1371	1358	1339	1327	1319	1319	1322	1323	1322	1321	1316	1326
14	1318	1334	1354	1369	1375	1368	1353	1331	1318	1311	1309	1314	1316	1315	1314	1309	1318
15	1308	1327	1348	1366	1371	1364	1345	1323	1308	1301	1301	1306	1309	1306	1305	1298	1308
16	1299	1319	1341	1361	1368	1359	1338	1314	1298	1291	1291	1299	1301	1299	1295	1288	1299
17	1289	1310	1334	1356	1363	1353	1332	1305	1288	1280	1282	1290	1294	1290	1286	1278	1289
18	1278	1300	1326	1350	1359	1347	1325	1294	1277	1269	1274	1281	1286	1281	1276	1267	1278
19	1266	1289	1318	1345	1354	1341	1316	1283	1266	1257	1263	1272	1278	1272	1266	1255	1266
20	1253	1278	1311	1339	1348	1335	1308	1272	1255	1246	1252	1264	1269	1263	1254	1243	1253
21	1241	1267	1302	1332	1342	1328	1298	1261	1241	1233	1241	1254	1260	1254	1243	1230	1241
22	1227	1255	1293	1325	1338	1321	1289	1249	1228	1219	1229	1244	1251	1244	1231	1217	1227
23	1214	1243	1283	1319	1331	1314	1279	1237	1215	1206	1217	1235	1242	1233	1219	1203	1214
24	1199	1230	1273	1311	1324	1306	1269	1223	1200	1192	1206	1224	1233	1223	1208	1189	1199
25	1185	1217	1263	1302	1317	1298	1259	1210	1186	1177	1193	1214	1223	1212	1196	1175	1185
26	1170	1205	1252	1294	1310	1289	1247	1197	1170	1163	1181	1204	1213	1201	1183	1160	1170
27	1154	1191	1240	1286	1303	1280	1236	1182	1155	1148	1167	1192	1202	1190	1169	1145	1154
28	1138	1176	1229	1277	1294	1271	1225	1169	1138	1133	1153	1181	1193	1178	1156	1129	1138
29	1122	1161	1216	1267	1286	1261	1211	1153	1122	1117	1140	1169	1183	1166	1142	1113	1122

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30	1105	1146	1205	1259	1277	1252	1198	1138	1106	1101	1126	1158	1172	1154	1127	1097	1105
31	1088	1130	1192	1248	1269	1241	1185	1123	1088	1083	1112	1146	1161	1144	1113	1081	1088
32	1070	1113	1179	1238	1260	1232	1173	1106	1070	1067	1097	1134	1148	1132	1098	1063	1070
33	1053	1097	1166	1227	1250	1220	1159	1090	1052	1051	1082	1121	1136	1118	1083	1046	1053
34	1035	1081	1152	1216	1240	1209	1144	1074	1035	1034	1067	1108	1125	1106	1068	1029	1035
35	1016	1063	1138	1205	1230	1198	1131	1057	1016	1016	1053	1095	1112	1094	1052	1011	1016
36	998	1046	1124	1194	1219	1187	1116	1040	997	997	1037	1083	1101	1081	1037	993	998
37	979	1029	1109	1184	1209	1175	1101	1022	978	980	1022	1070	1089	1069	1020	974	979
38	960	1011	1094	1172	1198	1163	1085	1004	958	962	1007	1057	1077	1055	1005	957	960
39	941	993	1080	1160	1187	1151	1071	985	939	943	991	1043	1064	1042	988	938	941
40	921	975	1065	1147	1176	1138	1056	967	919	925	975	1030	1051	1028	973	919	921
41	901	956	1050	1135	1164	1125	1039	949	899	906	960	1016	1038	1014	956	901	901
42	881	938	1034	1121	1153	1112	1024	930	879	887	943	1003	1025	1000	940	882	881
43	861	920	1018	1108	1140	1099	1009	911	858	868	927	989	1012	987	923	862	861
44	841	901	1002	1095	1128	1085	992	892	838	849	911	975	998	972	906	843	841
45	820	881	986	1082	1115	1072	976	873	817	830	894	961	985	958	890	823	820
46	799	862	971	1068	1103	1058	959	853	796	811	877	948	971	943	873	804	799
47	779	842	955	1054	1089	1044	943	834	776	791	861	933	958	928	856	785	779
48	758	823	939	1040	1077	1030	926	814	755	773	847	918	944	914	840	765	758
49	737	803	922	1026	1063	1015	909	794	734	753	829	904	931	899	823	745	737
50	716	784	905	1012	1050	1000	892	774	714	734	812	890	917	885	806	726	716
51	695	764	888	998	1036	986	876	754	693	714	795	875	903	870	789	707	695
52	674	744	872	983	1022	972	859	735	672	695	779	861	890	856	773	687	674
53	652	725	855	969	1008	957	842	715	650	675	763	847	876	841	756	668	652
54	631	705	839	954	994	942	825	695	630	656	746	832	862	827	740	648	631
55	609	685	822	939	979	928	808	675	609	636	730	818	849	812	723	628	609
56	588	666	806	924	965	912	791	656	587	617	714	803	835	798	707	609	588
57	566	647	789	909	951	898	775	636	566	598	698	789	821	783	691	590	566
58	545	627	771	894	937	882	758	617	544	578	682	774	808	768	675	571	545
59	524	608	755	878	922	867	742	598	523	559	666	760	794	753	659	551	524
60	502	589	739	863	907	852	725	578	502	540	650	746	780	739	643	533	502
61	481	569	723	848	892	837	709	558	480	522	634	731	766	725	627	514	481

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62	459	551	706	833	877	822	692	539	459	504	619	717	752	711	611	495	459
63	439	531	690	818	862	807	676	519	438	486	604	703	738	696	595	477	439
64	417	513	674	803	847	791	660	501	417	468	589	688	725	682	580	459	417
65	396	495	658	787	832	776	644	483	396	450	574	674	711	668	565	441	396
66	375	477	642	772	817	762	629	464	375	432	559	660	697	654	550	423	375
67	354	459	626	758	802	746	613	446	354	415	544	646	683	640	535	405	354
68	333	441	611	742	787	731	597	428	333	398	530	632	670	626	520	388	333
69	312	423	595	727	772	716	582	410	312	381	516	618	656	613	506	371	312
70	292	406	580	712	756	702	567	393	292	365	502	605	642	599	491	354	292
71	271	389	565	697	742	687	551	376	272	349	488	592	629	586	477	338	271
72	251	373	551	683	727	672	537	360	251	333	474	579	615	572	464	322	251
73	231	356	537	668	712	657	522	344	232	317	461	565	602	559	450	306	231
74	211	341	522	653	698	643	508	328	212	302	447	553	589	546	436	291	211
75	192	325	508	639	683	628	494	312	193	287	434	539	575	533	423	276	192
76	173	310	494	624	668	614	480	297	174	273	421	527	560	521	410	261	173
77	154	295	480	610	654	600	466	283	155	259	409	514	546	508	398	247	154
78	136	281	466	595	640	586	453	268	137	246	397	502	532	496	385	233	136
79	118	267	453	581	625	573	440	254	120	233	384	490	518	483	373	220	118
80	101	254	440	567	612	559	427	241	103	220	372	478	504	472	361	207	101
81	85	241	427	554	598	546	414	228	87	208	360	466	491	460	350	195	85
82	70	229	414	540	584	532	402	216	71	196	349	454	478	448	339	184	70
83	56	217	402	525	571	520	390	204	57	185	338	442	465	437	328	173	56
84	43	206	390	512	557	507	378	193	44	174	327	431	453	426	317	162	43
85	31	195	378	498	544	494	366	182	32	164	317	420	440	415	307	152	31
86	21	185	366	484	531	482	354	171	22	155	306	409	429	403	297	143	21
87	13	175	354	472	518	469	343	162	14	146	296	398	418	393	287	134	13
88	6	165	343	460	505	457	332	152	7	137	286	388	407	382	278	126	6
89	2	156	332	447	493	446	322	144	3	129	276	377	396	372	268	118	2
90	1	147	322	435	480	434	311	136	2	121	267	367	386	362	255	111	1
91	0	139	311	423	468	423	301	128	2	114	258	357	376	352	250	104	0
92	0	132	301	412	457	412	292	121	2	108	249	347	366	342	242	98	0
93	0	125	292	401	445	401	283	113	1	101	241	338	357	333	234	92	0

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94	0	108	282	391	434	391	274	91	1	89	233	328	348	324	226	78	0
95	0	78	273	381	423	380	264	59	1	65	225	319	340	315	218	55	0
96	0	48	262	371	412	370	248	38	1	36	217	310	331	307	210	35	0
97	1	42	228	361	401	359	211	34	1	28	196	302	322	298	187	30	1
98	1	43	178	343	388	337	159	38	2	30	162	291	314	289	153	32	1
99	1	49	122	301	359	291	103	44	2	38	118	266	301	261	110	36	1
100	1	50	65	243	309	234	48	47	3	41	70	227	271	223	61	36	1
101	2	50	25	181	247	171	22	48	3	43	25	180	231	176	22	36	2
102	2	50	30	117	183	108	30	48	4	43	18	128	183	124	22	36	2
103	2	49	49	55	119	47	54	48	4	43	31	73	131	68	34	35	2
104	3	48	76	8	57	7	85	48	5	43	51	22	77	18	51	34	3
105	3	45	106	11	10	14	118	47	5	42	77	5	25	5	74	33	3
106	3	43	132	35	10	39	138	45	6	41	106	17	5	19	98	32	3
107	4	41	135	71	34	75	146	43	6	39	123	39	16	40	105	30	4
108	5	39	133	110	71	115	143	42	7	38	119	67	39	68	103	29	5
109	5	39	131	151	113	156	139	40	7	37	116	99	67	101	102	28	5
110	5	38	129	190	155	189	136	39	7	35	112	135	101	135	100	27	5
111	6	38	127	211	197	206	132	38	8	34	109	168	136	163	98	26	6
112	7	37	125	209	226	209	128	38	8	34	106	173	172	168	96	26	7
113	7	37	122	204	232	204	125	37	9	33	103	169	189	165	94	25	7
114	7	36	120	198	228	198	121	36	9	32	100	165	187	160	92	24	7
115	7	35	117	193	221	193	118	35	10	31	98	160	182	156	90	23	7
116	8	35	114	187	215	187	114	34	10	30	95	155	176	151	88	23	8
117	8	34	111	182	208	182	111	33	11	29	92	151	171	147	86	24	8
118	9	34	108	176	202	177	108	32	11	28	90	147	166	143	84	24	9
119	10	33	105	171	196	172	105	32	11	29	87	142	161	138	82	23	10
120	10	33	103	166	190	167	102	31	12	29	84	138	156	134	80	23	10
121	11	33	100	162	184	162	99	31	12	29	82	134	151	130	78	23	11
122	11	33	97	157	179	157	96	31	12	29	80	130	146	126	76	23	11
123	11	33	95	152	173	152	93	31	13	28	78	126	142	122	74	23	11
124	12	33	92	147	168	147	91	31	14	28	76	122	137	118	72	23	12
125	12	33	90	143	162	142	88	31	14	28	74	118	133	115	70	23	12

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126	12	32	87	138	157	138	86	31	14	28	72	114	129	111	69	22	12
127	13	32	85	134	151	133	83	30	15	28	70	110	124	107	67	22	13
128	14	32	82	129	147	129	81	30	15	28	68	107	120	104	64	22	14
129	14	32	80	125	142	125	79	30	16	28	66	103	116	101	62	21	14
130	14	31	77	121	137	121	77	29	16	27	63	100	112	98	60	21	14
131	15	31	75	117	133	117	74	29	17	27	61	97	109	95	58	21	15
132	15	31	72	113	128	114	72	29	17	27	58	94	105	92	56	21	15
133	15	31	70	110	124	110	70	29	17	27	56	91	102	89	55	21	15
134	16	31	68	106	120	106	67	28	18	27	54	88	98	86	54	21	16
135	17	30	66	102	116	103	65	28	18	27	54	85	95	83	53	21	17
136	17	30	64	99	112	100	63	28	18	27	54	82	92	80	52	20	17
137	18	30	62	95	108	96	61	28	19	26	52	79	88	77	50	20	18
138	19	26	60	92	105	93	60	26	19	26	51	75	85	74	49	19	19
139	19	14	58	88	101	90	58	18	19	25	50	72	82	71	47	19	19
140	19	6	56	85	97	87	57	8	20	16	48	69	79	68	46	14	19
141	19	4	55	82	93	84	55	6	20	8	47	66	75	66	44	8	19
142	19	4	53	79	90	80	54	6	20	7	45	65	72	65	43	6	19
143	20	4	51	76	86	78	53	5	20	7	44	63	69	63	42	6	20
144	19	4	49	73	83	75	51	5	20	7	42	61	67	61	40	5	19
145	20	7	48	70	79	72	50	5	20	11	40	59	65	58	38	5	20
146	20	15	46	67	76	70	49	5	20	20	38	57	63	56	37	6	20
147	20	22	45	65	73	67	48	5	20	24	37	54	61	54	36	7	20
148	20	25	44	62	70	65	47	5	20	24	38	53	59	52	35	13	20
149	20	25	42	60	67	62	46	6	20	24	38	51	57	50	35	20	20
150	20	24	41	57	64	60	45	8	20	23	37	48	55	48	34	24	20
151	20	24	40	55	61	58	44	13	19	22	35	45	52	46	34	24	20
152	19	24	39	53	59	56	44	19	20	22	33	42	50	43	33	24	19
153	19	24	38	51	56	54	43	24	20	22	17	41	48	41	31	24	19
154	19	24	30	49	54	52	42	27	21	20	4	41	45	40	30	23	19
155	18	23	10	47	51	50	41	27	21	20	3	41	42	39	27	22	18
156	18	23	3	45	49	48	40	27	22	20	4	40	41	39	15	22	18
157	18	23	3	43	47	47	37	27	22	19	13	38	40	38	5	22	18

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158	17	23	3	41	45	45	22	27	23	17	24	36	40	36	3	22	17
159	18	23	5	39	43	43	5	26	23	16	25	20	39	35	3	22	18
160	18	22	18	18	41	41	2	26	23	15	25	3	37	33	3	22	18
161	18	22	27	3	30	27	2	25	23	14	25	2	35	21	7	22	18
162	18	22	27	2	5	4	3	25	23	16	25	3	30	6	19	22	18
163	19	22	27	2	2	2	6	26	23	18	23	13	10	3	26	22	19
164	19	23	25	10	2	3	23	26	23	18	22	26	3	3	26	22	19
165	19	23	25	27	8	8	29	25	22	18	21	27	3	5	26	22	19
166	20	23	25	28	27	27	28	24	22	19	20	27	5	20	25	22	20
167	20	24	25	27	29	29	27	24	22	19	20	26	20	27	25	22	20
168	21	24	24	25	28	28	27	24	22	20	20	26	29	27	24	21	21
169	21	24	24	25	28	28	26	23	23	21	20	25	30	27	24	20	21
170	21	24	25	24	27	27	26	24	23	22	19	23	30	26	24	19	21
171	21	24	26	25	26	26	25	24	23	22	19	21	29	24	24	18	21
172	21	24	26	25	25	25	25	23	23	23	18	21	28	22	24	17	21
173	22	23	25	24	25	25	24	23	24	24	17	20	26	21	22	16	22
174	22	23	24	23	25	24	23	23	24	24	19	19	25	20	20	17	22
175	23	23	24	23	24	24	22	23	25	25	20	18	23	19	19	19	23
176	24	24	24	24	23	23	22	23	25	25	22	17	21	18	17	22	24
177	24	24	23	24	23	23	23	24	25	25	24	20	18	17	18	23	24
178	25	24	24	23	23	22	23	24	24	25	25	23	16	19	21	23	25
179	25	24	24	22	17	18	22	23	24	25	24	23	16	21	22	24	25
180	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25

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

Test date	2016-05-07	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-ST04-0040-35-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161532	120.0	60	0.3370	39.86	0.9856	12.98
-A2	277.0	60	0.1590	39.95	0.9070	18.47

Integrating Sphere Method:

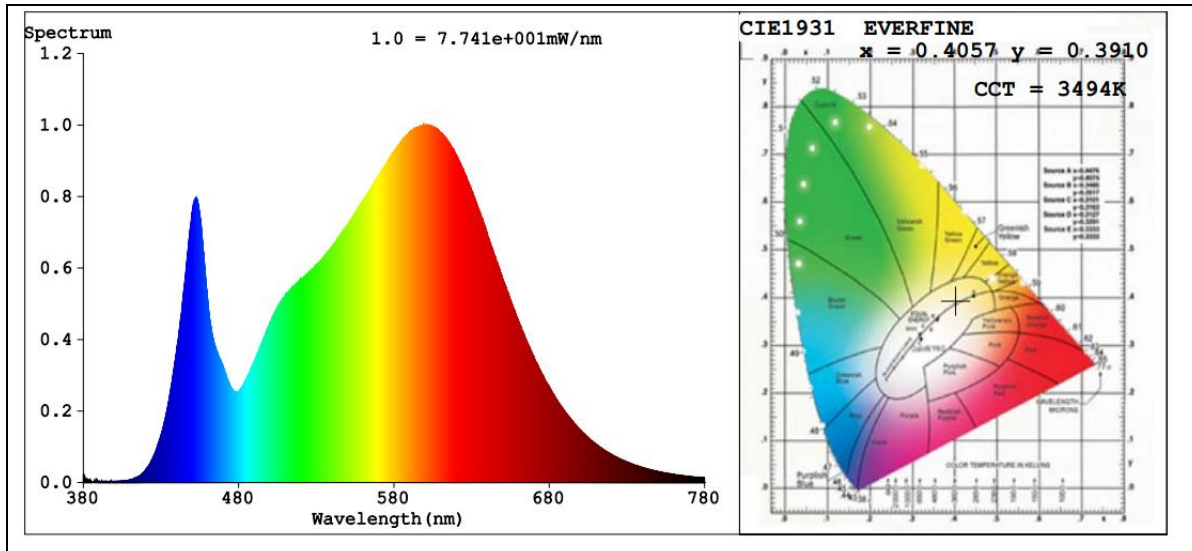
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	84.4
R9	15
CCT (K)	3494
Chromaticity (x, y)	x=0.4057 y=0.3910
Chromaticity (u', v')	u'=0.2358 v'=0.5114
Duv	0.0000
Total Luminous (lm)	5271
Luminous Efficacy (lm/W)	132.24

Special Color Rendering Indices			
R1	83	R9	15
R2	91	R10	80
R3	97	R11	82
R4	83	R12	70
R5	83	R13	85
R6	89	R14	99
R7	86	R15	76
R8	65	--	--

Integrating Sphere Method:

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	5253
Luminous Efficacy (lm/W)	131.49

Spectral Power Distribution & Chromaticity Diagram



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2.3 Electrical, Photometric and Chromaticity Measurements
 (Refer to Work Instruction QD25)

IES LM-79 2008

Test date	2016-05-07	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-ST04-0040-40-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161532	120.0	60	0.3406	40.33	0.9868	12.53
-A3	277.0	60	0.1607	40.42	0.9081	18.02

Integrating Sphere Method:

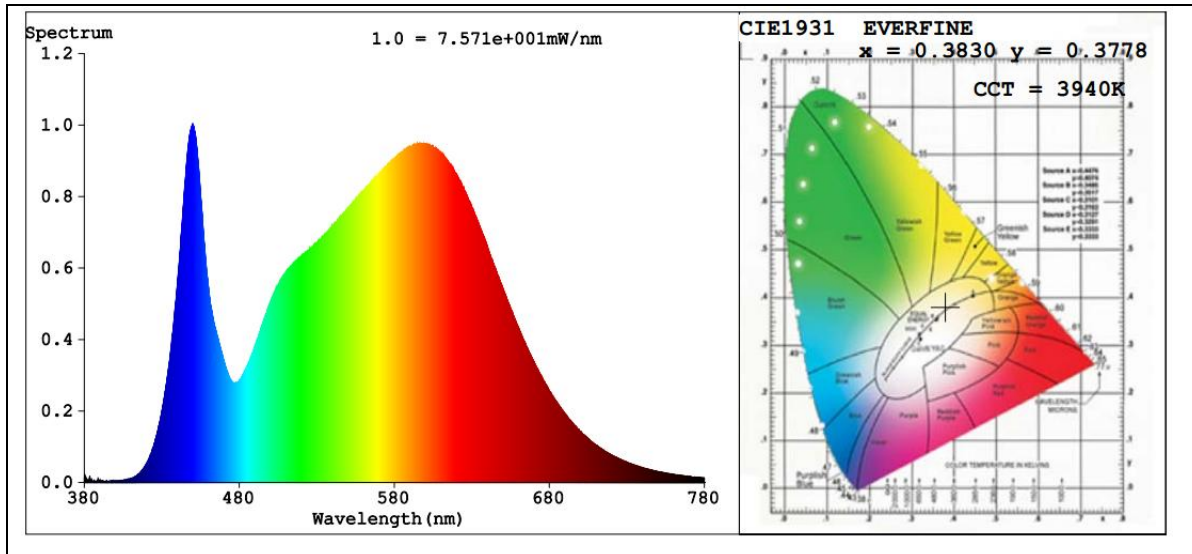
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	85.5
R9	21
CCT (K)	3940
Chromaticity (x, y)	x=0.3830 y=0.3778
Chromaticity (u', v')	u'=0.2263 v'=0.5024
Duv	-0.0002
Total Luminous (lm)	5389
Luminous Efficacy (lm/W)	133.62

Special Color Rendering Indices			
R1	84	R9	21
R2	91	R10	78
R3	95	R11	85
R4	85	R12	69
R5	84	R13	86
R6	87	R14	97
R7	88	R15	79
R8	69	--	--

Integrating Sphere Method:

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	5371
Luminous Efficacy (lm/W)	132.88

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
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Test date	2016-05-07	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-ST04-0040-50-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161532	120.0	60	0.338	39.98	0.9857	12.79
-A4	277.0	60	0.1595	40.07	0.9071	18.28

Integrating Sphere Method:

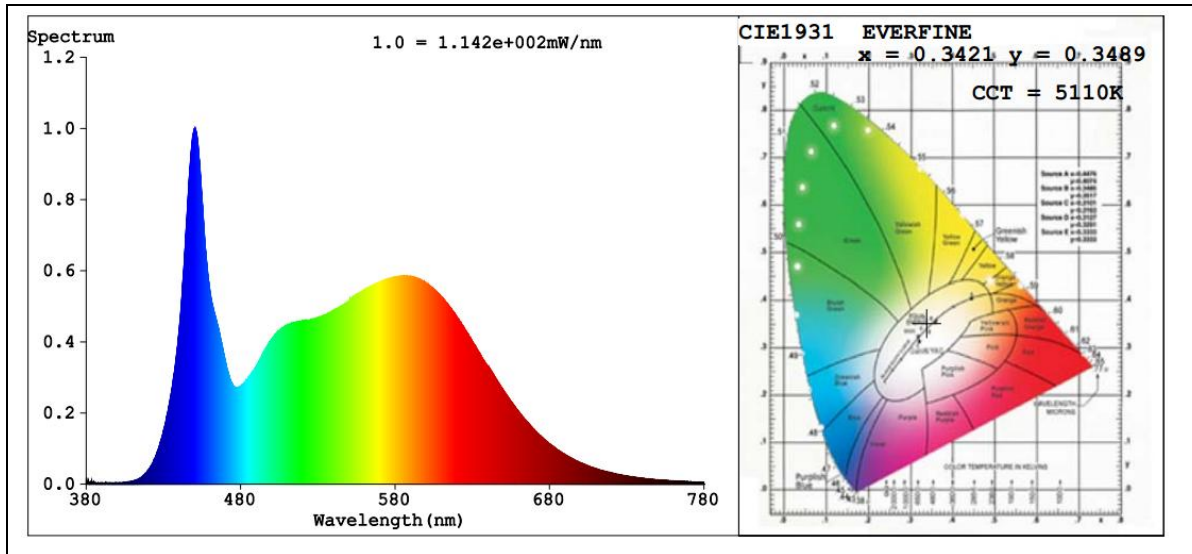
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	85.3
R9	13
CCT (K)	5110
Chromaticity (x, y)	x=0.3421 y=0.3489
Chromaticity (u', v')	u'=0.2104 v'=0.4829
Duv	-0.0001
Total Luminous (lm)	5399
Luminous Efficacy (lm/W)	135.04

Special Color Rendering Indices			
R1	84	R9	13
R2	91	R10	80
R3	95	R11	85
R4	85	R12	70
R5	85	R13	86
R6	88	R14	98
R7	86	R15	78
R8	68	--	--

Integrating Sphere Method:

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	5381
Luminous Efficacy (lm/W)	134.29

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 *******