UL LLC
1075 W Lambert Rd Suite B
Brea, CA 92821

Photometric Test Report

Relevant Standards
IES LM-79-2008
ANSI C78.377-2011, ANSI C82.77-2002
CIE 13.3-1995, CIE 15-2004, IES TM-30-15

Prepared For

B-K LIGHTING INC

Chris McCarthy
40429 Brickyard Dr
Madera, CA 93636-9515
United States

Catalog Number

HP2-LED-x45-WFL-9 CO2-LED-x45-WFL-9

Order Number
11353040
Test Number
11353040.07

Test Date

2016-09-02 - 2016-09-06

Prepared By

Khang Nguyen, Technician

Approved By

Eric Gaudreau, Senior Engineering Associate

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Laboratory results may not be representative of field performance
Ballast factors have not been applied

Testing was performed in a 2-meter integrating sphere using the 4π geometry method.

Absorption correction was employed for Sphere measurement

Luminaire Description:	Circular formed black aluminum cylinder housing with an internal faceted gray plastic reflector and a clear glass lens
Lamp:	One (1) White LED
Mounting:	Surface
Ballast/Driver:	One (1) POWERSELECT PS60U700C21T

Luminaire

Luminaire Characteristics

Luminous Diameter: 3.75 in.

Summary of Results

Integrating Sphere

Luminous Flux:	1777	Lumens
Efficacy:	61.3	lm/w
CCT:	4157	K
CRI (Ra):	81.8	

Distribution

Total Luminaire Output:	1727 Lumens
Luminaire Efficacy:	59.5 lm/w
Maximum Candela:	2485 Candela

Electrical Data at 120 VAC

Test Temperature:	24.6	°C
Voltage:	120.1	VAC
Current:	0.2450	A
Power:	28.98	W
Power Factor:	0.985	
Frequency:	60	Hz
Current THD:	14.3	%

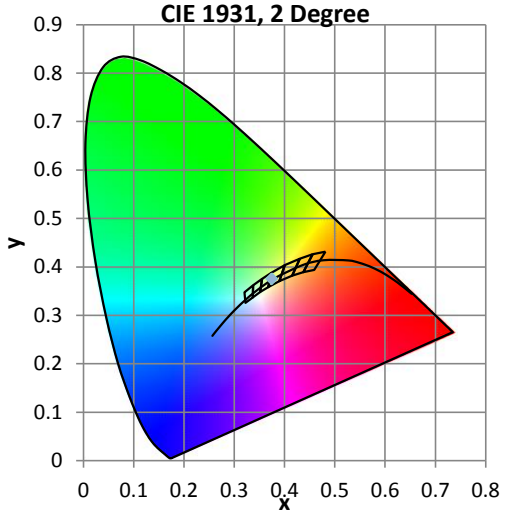
Color Quality - Integrating Sphere

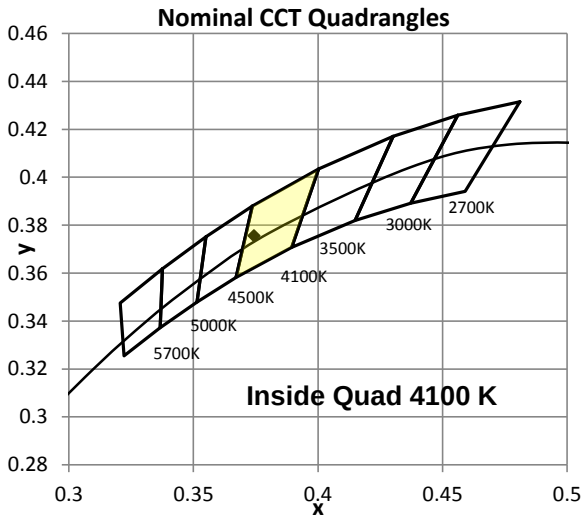
Integrating Sphere Test Conditions

Temperature	Voltage	Current	Power	Power Factor	Frequency	Current THD
24.6 °C	120.1 VAC	0.2450 A	28.98 W	0.985	60 Hz	14.3 %

Summary of Results

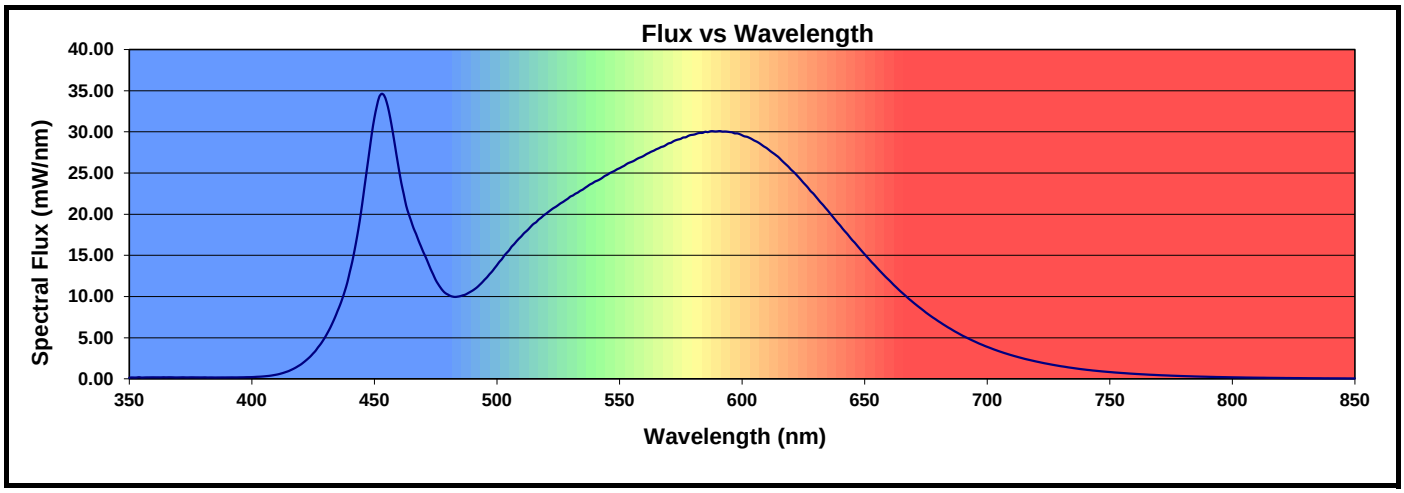
Total Output:	1777 Lumens	**Chromaticity (x):**	0.3744
Efficacy:	61.3 lm/w	**Chromaticity (y):**	0.3755
CCT:	4157 K	**Chromaticity (u'):**	0.2216
CRI (Ra):	81.8	**Chromaticity (v'):**	0.5001
CRI (R9):	5.3	**TM-30 R_f:**	80.7
Peak Wavelength:	453.2 nm	**TM-30 R_g:**	93.8
Dominant Wavelength:	577.7 nm	**Duv:**	0.0009
S/P Ratio:	1.724		





Color Rendering Index Detail

Ra (CRI)	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
81.8	79.7	88.6	94.2	79.2	79.3	83.3	86.0	63.7	5.3	72.0	76.7	57.9	81.9	96.9



Distribution - Goniophotometer

Distribution Test Conditions

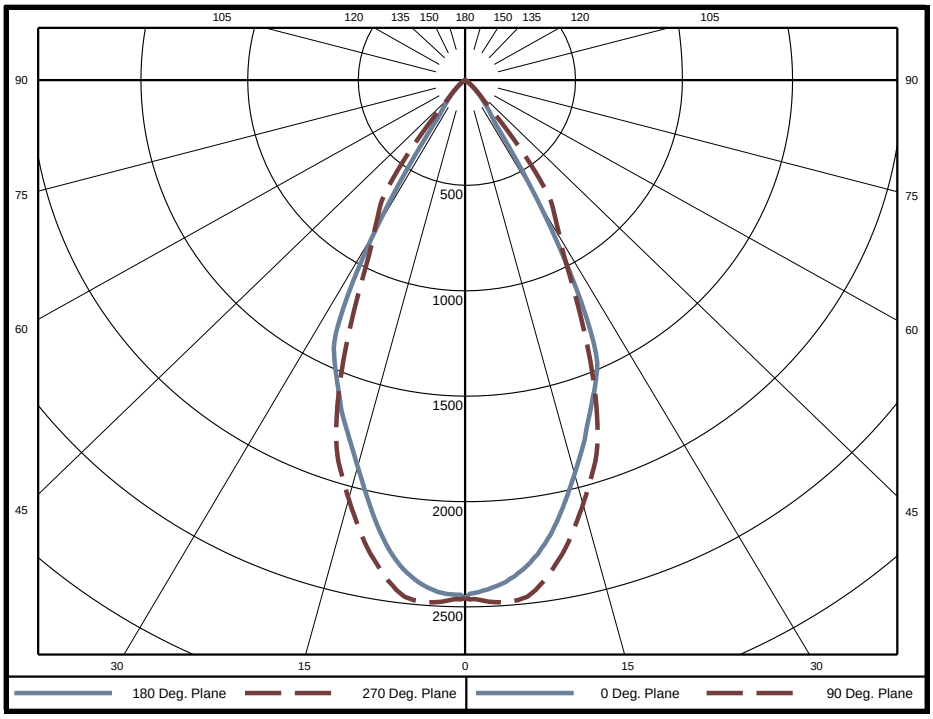
Temperature	Voltage	Current	Power	Power Factor	Frequency	Current THD
24.5 °C	120.0 VAC	0.2455 A	29.02 W	0.984	60 Hz	14.3 %

Summary of Results

Spacing Criteria
0-180: 0.83
90-270: 0.82

Total Lumen Output: 1727 Lumens
Luminaire Efficacy: 59.5 lm/w
Maximum Candela: 2485 Candela

Polar Plot



Zonal Lumen Summary

Zone	Lumens	% of Luminaire	Zone	Lumens	% of Luminaire	Zone	Lumens	% of Luminaire
0-5	58.6	3.4%	60-65	1.7	0.1%	120-125	0	0.0%
5-10	169.4	9.8%	65-70	1.1	0.1%	125-130	0	0.0%
10-15	253.6	14.7%	70-75	0.6	0.0%	130-135	0	0.0%
15-20	306.1	17.7%	75-80	0.3	0.0%	135-140	0	0.0%
20-25	319.0	18.5%	80-85	0.1	0.0%	140-145	0	0.0%
25-30	267.7	15.5%	85-90	0.0	0.0%	145-150	0	0.0%
30-35	185.1	10.7%	90-95	0	0.0%	150-155	0	0.0%
35-40	92.0	5.3%	95-100	0	0.0%	155-160	0	0.0%
40-45	39.0	2.3%	100-105	0	0.0%	160-165	0	0.0%
45-50	19.9	1.2%	105-110	0	0.0%	165-170	0	0.0%
50-55	8.7	0.5%	110-115	0	0.0%	170-175	0	0.0%
55-60	3.5	0.2%	115-120	0	0.0%	175-180	0	0.0%

Zone	Lumens	% of Luminaire
0-40	1652	95.6%
0-60	1723	99.7%
0-90	1726	100.0%
90-180	0	0.0%

Candela Tabulation

Horizontal Angle (Degrees)

Vertical Angle (Degrees)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5
0	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458
5	2376	2385	2427	2464	2480	2480	2464	2433	2396	2433	2464	2480	2480	2464	2427	2385
10	2208	2200	2270	2324	2336	2336	2312	2259	2200	2259	2312	2336	2336	2324	2270	2200
15	1944	1931	1985	2038	2069	2067	2033	1971	1908	1971	2033	2067	2069	2038	1985	1931
20	1685	1671	1703	1712	1744	1777	1758	1708	1671	1708	1758	1777	1744	1712	1703	1671
25	1432	1312	1238	1203	1227	1276	1353	1444	1433	1444	1353	1276	1227	1203	1238	1312
30	727	720	809	826	850	850	857	938	857	938	857	850	850	826	809	720
35	227	252	407	548	622	613	514	355	223	355	514	613	622	548	407	252
40	136	135	141	156	194	185	145	136	123	136	145	185	194	156	141	135
45	76	69	70	73	75	75	73	73	67	73	73	75	75	73	70	69
50	28	26	30	35	37	36	32	29	24	29	32	36	37	35	30	26
55	11	11	11	13	14	13	12	11	9	11	12	13	14	13	11	11
60	4	4	5	5	6	6	5	5	4	5	5	6	6	5	5	4
65	2	2	2	3	3	3	3	2	2	2	3	3	3	3	2	2
70	1	1	2	2	2	2	2	2	1	2	2	2	2	2	2	1
75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85	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
95	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
105	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
115	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
125	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
135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	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
150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
155	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
165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
175	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

Average Luminance (cd/m^2)

Horizontal Angle (Degrees)

Vertical Angle (Degrees)	0	45	90
0	345000	345000	345000
45	15120	13860	14940
55	2728	2789	3376
65	626	756	1086
75	478	443	469
85	284	270	199

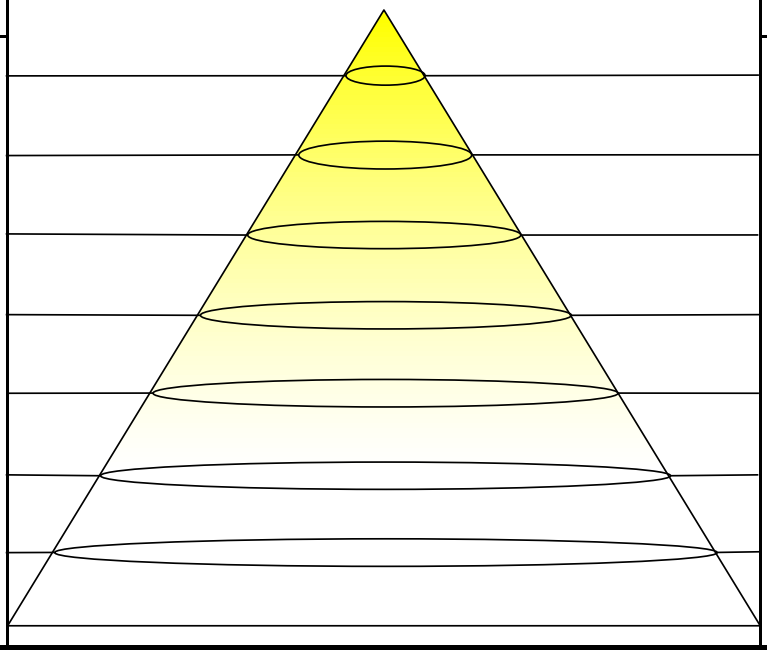
Utilization of Lumens - Zonal Cavity Method

Effective Floor Cavity Reflectance 20%																		
Ceiling Cavity Reflectance	80				70				50			30			10			0
Wall Reflectance	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
Room Cavity Ratio (RCR)	** Values are expressed as Lumens delivered to the task surface **																	
0	2055	2055	2055	2055	2008	2008	2008	2008	1918	1918	1918	1837	1837	1837	1762	1762	1762	1727
1	1966	1921	1880	1844	1924	1884	1848	1815	1814	1785	1759	1750	1728	1707	1691	1674	1657	1627
2	1877	1798	1732	1677	1839	1768	1709	1659	1713	1665	1623	1662	1623	1588	1615	1583	1555	1528
3	1790	1687	1606	1543	1757	1663	1589	1530	1618	1557	1506	1577	1526	1482	1539	1496	1460	1434
4	1708	1586	1497	1429	1677	1567	1484	1421	1530	1460	1404	1496	1436	1388	1465	1414	1372	1347
5	1629	1495	1401	1331	1602	1479	1391	1325	1449	1372	1314	1421	1354	1302	1394	1337	1291	1267
6	1555	1411	1315	1246	1530	1398	1308	1242	1373	1293	1234	1349	1279	1225	1327	1266	1217	1194
7	1485	1335	1238	1171	1463	1324	1233	1168	1303	1221	1161	1283	1210	1155	1264	1199	1149	1127
8	1419	1266	1169	1103	1399	1256	1164	1101	1238	1155	1096	1221	1146	1092	1205	1137	1087	1065
9	1357	1202	1107	1042	1339	1194	1103	1040	1178	1095	1037	1163	1088	1033	1149	1080	1030	1009
10	1300	1143	1049	987	1283	1136	1046	986	1122	1040	983	1109	1034	980	1097	1028	978	957

Beam and Field Information	
CIE Type:	Direct
Center Beam Intenisty:	2458 Candela
Central Cone Intensity:	2454 Candela
Beam Flux:	1158.7 Lumens
Beam Angle (0-180):	54.1 Degrees
Beam Angle (90-270):	50.0 Degrees
Field Angle (0-180):	69.0 Degrees
Field Angle (90-270):	78.5 Degrees

Cone of Light Tabulation

Mounting Height (Feet)	Footcandles at Nadir	Diameter (Feet)
4.00	154	3.28
6.00	68.3	4.92
8.00	38.4	6.56
10.0	24.6	8.20
12.0	17.1	9.83
14.0	12.5	11.5
16.0	9.60	13.1



ISOFootcandle Plot

Mounting Height - 8 Feet