

Photometric Test Report

Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77:2017

Prepared For

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Issue Date

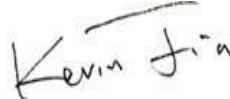
2020/11/10

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

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1.0 Test Summary

DLC Technical Requirements v5.1

Outdoor - Architectural Flood and Spot Luminaires				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	1000		4400
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	144.5
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		30.5
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	5.81%
		20.00%	277V	6.60%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.996
		0.9	277V	0.966
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	5029±355	4918
		4 step	5029±220	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥70		75
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥-40		-24
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		76
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		92
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-17%
Zonal Lumen Requirement (0°-90°) (Goniophotometer - Section 4.2)	IES LM-79-2008	85%		100.00%
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		120
(Goniophotometer - Section 4.2)		Non-Worst Case		277
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		0.255
(Goniophotometer - Section 4.2)		Non-Worst Case		0.113
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		30.5
(Goniophotometer - Section 4.2)		Non-Worst Case		30.3

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2020/11/6	PIP30/D10	C1
2	Goniophotometer Test	2020/11/6	PIP30/D10	C1
3	THD and PF Test	2020/11/6	PIP30/D10	C1

Remark(If any)

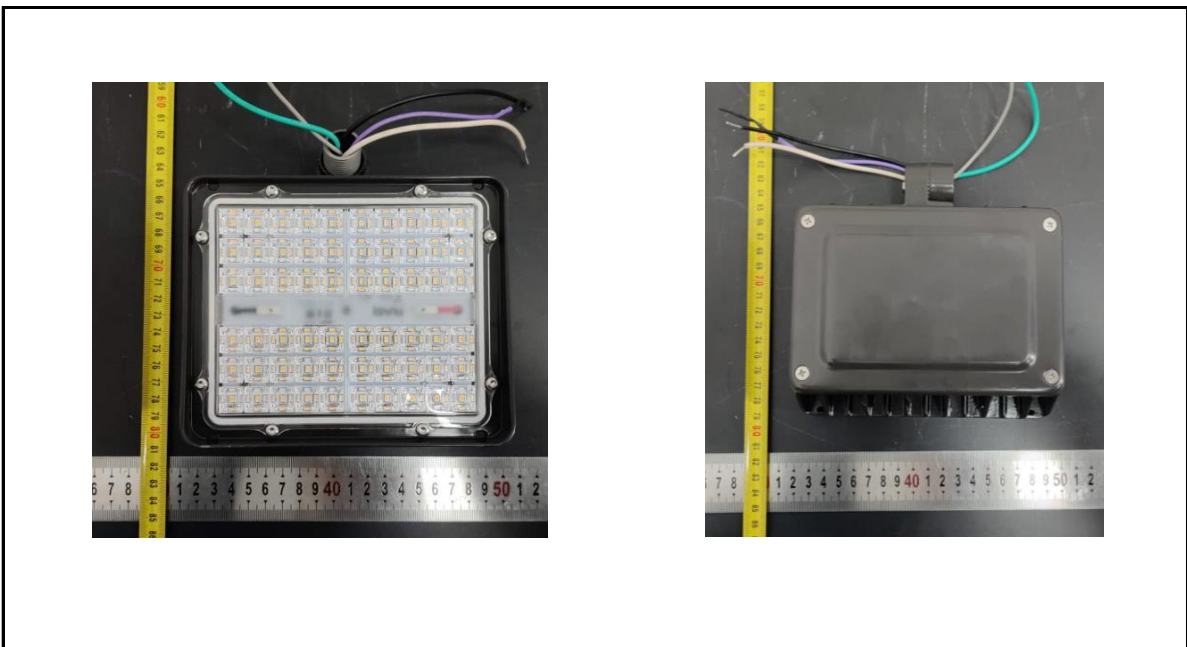
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3.0 Production Description

Luminaire Description: PIP30/D10

Electrical Specification: 120V-277V,50/60HZ

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	PIP30/D10	Sample ID.	C1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.4	Humidity (%RH)	54.0

Test Method

The samples were tested according to the IES LM-79-2008.

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 voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.02	60	0.254	30.4	0.996
277.02	60	0.113	30.3	0.966

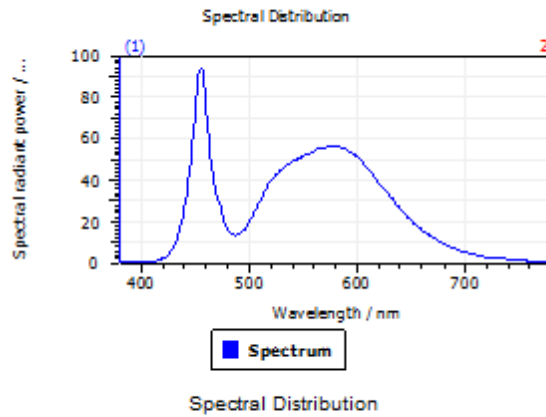
Test Result

CCT (K)	CRI	R9	Duv
4918	75	-24	0.0021

Rf	Rg	IES Rcs,h1
76	92	-17%

4.1 Integrating Sphere Test

Results



Spectral values

DominantWavelength 571.80 nm
Purity 0.119
PeakWavelength 454.94 nm
Radiant Power 9.947 W
Width50%:

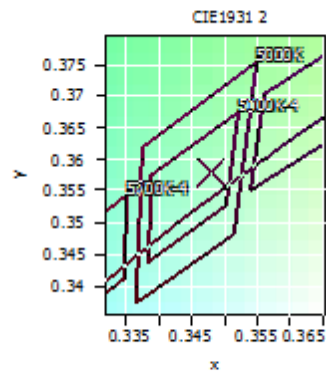
Color Coordinates

Correlated Color Temperatu 4918 K

x: 0.3479 u: 0.2108 u': 0.2108
y: 0.3581 v: 0.3255 v': 0.4882

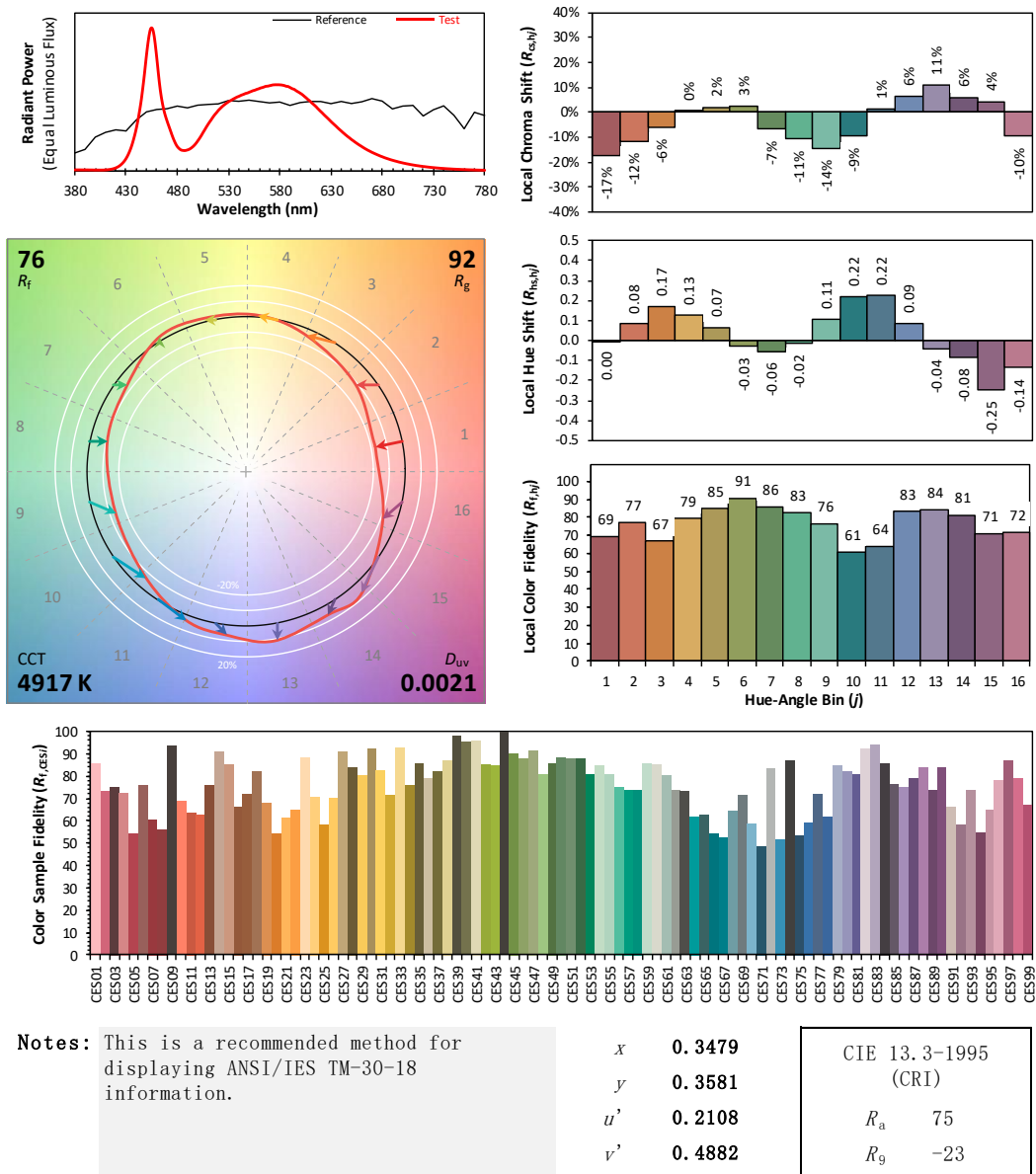
CRI01	71.8	CRI09	-23.6
CRI02	82.7	CRI10	57.2
CRI03	88.7	CRI11	66.7
CRI04	71.5	CRI12	40.1
CRI05	71.4	CRI13	74.6
CRI06	74.4	CRI14	93.8
CRI07	83.7	CRI15	65.8
CRI08	56.5	CRI16	63.6

ResultsCRI 75.1



PlanckDistance 2.1E-003

4.1 Integrating Sphere Test



Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	PIP30/D10	Sample ID.	C1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	54.0

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using a type C 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 voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 0.5° vertical intervals and 10° horizontal intervals.

Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	119.97	60	0.255	30.5	0.995
NON-WORST CASE	277.01	60	0.113	30.3	0.965

Test Result

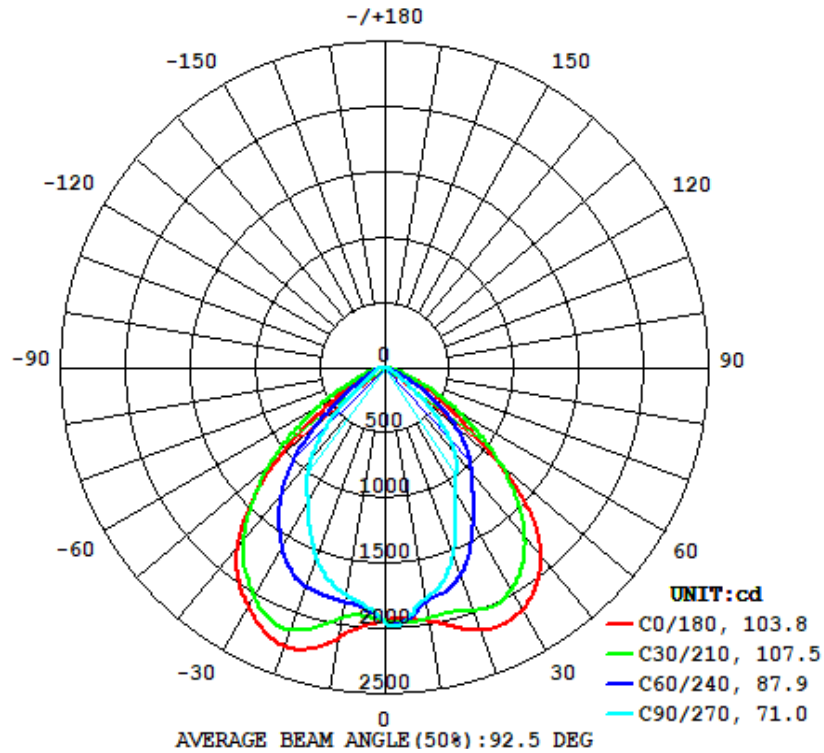
Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
4400	141.1	112.3	103.8	71.0	144.5

Zonal Lumen Requirement
(0° - 90°)

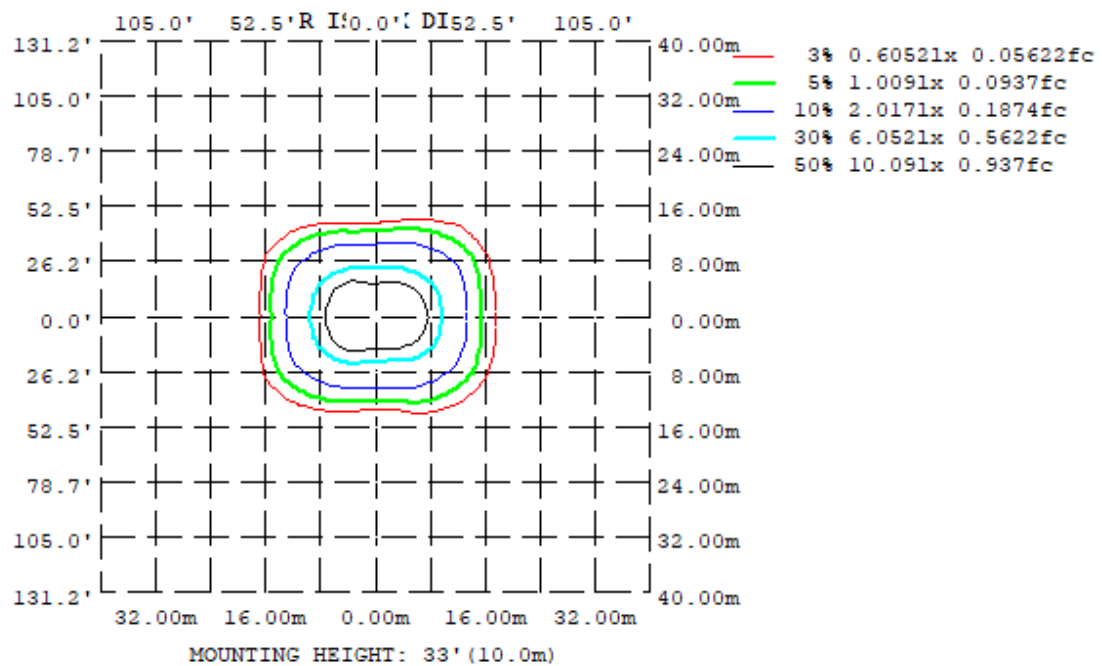
100.00%

4.2 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	1971	1876	1799	1965	2094	1875	1770	1820
20	2137	1854	1545	2059	2272	2012	1553	1869
30	2131	1700	1103	1883	2114	1904	1198	1799
40	1883	1352	846.5	1420	1769	1463	881.5	1484
50	1168	935.4	420.0	926.3	1096	979.0	432.3	1047
60	504.7	501.9	137.1	492.6	401.6	483.3	158.8	577.8
70	228.8	192.3	62.38	192.8	186.7	188.9	89.37	244.6
80	56.53	44.26	25.23	44.25	52.11	58.55	45.90	69.03
90	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0
DEG	LUMINOUS INTENSITY:cd							

	Zonal (lm)		Total (lm)	Percent
0-10	183.21	0 - 10	183.21	4.16%
10-20	543.21	0 - 20	726.41	16.51%
20-30	844.87	0 - 30	1571.28	35.71%
30-40	978.00	0 - 40	2549.28	57.94%
40-50	894.86	0 - 50	3444.14	78.27%
50-60	565.81	0 - 60	4009.96	91.13%
60-70	265.71	0 - 70	4275.67	97.17%
70-80	104.02	0 - 80	4379.68	99.53%
80-90	20.55	0 - 90	4400.23	100.00%
90-100	0.00	0 - 100	4400.23	100.00%
100-110	0.00	0 - 110	4400.23	100.00%
110-120	0.00	0 - 120	4400.23	100.00%
120-130	0.00	0 - 130	4400.23	100.00%
130-140	0.00	0 - 140	4400.23	100.00%
140-150	0.00	0 - 150	4400.23	100.00%
150-160	0.00	0 - 160	4400.23	100.00%
160-170	0.00	0 - 170	4400.23	100.00%
170-180	0.00	0 - 180	4400.23	100.00%

4.2 Goniophotometer Test

Axial Candela

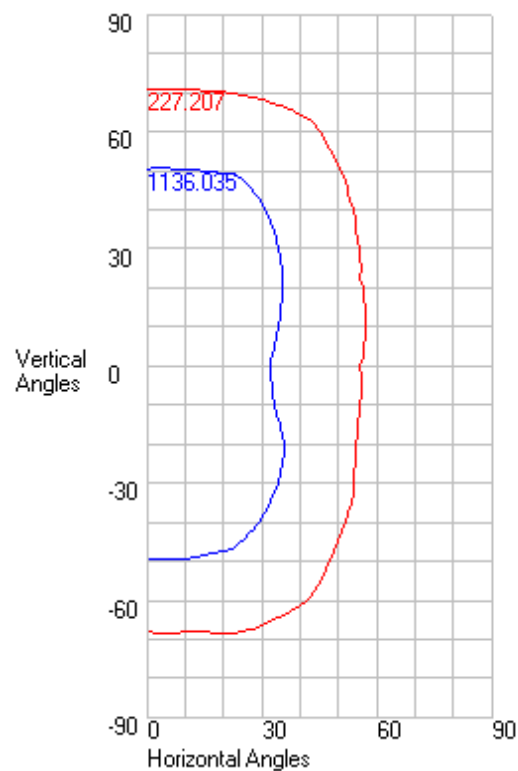
DEG.	HOR.	DEG.	VERT.
90	0.165	90	0.018
85	24.33	85	15.1
75	67.6	75	122.47
65	116.54	65	365.08
55	233.33	55	753.85
47.5	549.59	47.5	1396.46
42.5	771.46	42.5	1764.89
37.5	974.73	37.5	1965.49
33	1106.49	33	2081.21
29	1233.7	29	2140.7
25.5	1355.58	25.5	2161.35
22.5	1459.75	22.5	2161.46
19.5	1569.54	19.5	2131.12
17	1641.13	17	2091.65
15	1686.75	15	2052.78
13	1722.71	13	2017.35
11	1755.54	11	1984.57
9	1780.83	9	1960.2
7	1799.83	7	1940.9
5	1827.07	5	1924.09
3	1871.73	3	1919.19
1	1915.79	1	1928.69
0	1946.686	0	1946.686
-1	1974.09	-1	1946.77
-3	1979.63	-3	1962.27
-5	1937.82	-5	1982.06
-7	1876.51	-7	2015.05
-9	1819.93	-9	2063.63
-11	1782.11	-11	2125.73
-13	1752.02	-13	2181.65
-15	1708.33	-15	2226.17
-17	1649.66	-17	2256.78
-19.5	1564.45	-19.5	2272.07
-22.5	1433.29	-22.5	2257.22
-25.5	1292.15	-25.5	2213.26
-29	1141.01	-29	2136.28
-33	1015.76	-33	2038.15
-37.5	919.96	-37.5	1883.73
-42.5	749.56	-42.5	1630.15
-47.5	533.92	-47.5	1298.01
-55	214.95	-55	684.04
-65	83.83	-65	284.44
-75	44.98	-75	103.09
-85	6.32	-85	17.42
-90	0.001	-90	0.034

4.2 Goniophotometer Test

Characteristics

NEMA Type	6 H x 7 V
Maximum Candela	2272.07
Maximum Candela Angle	0 H -19.5 V
Horizontal Beam Angle (50%)	70
Vertical Beam Angle (50%)	100
Horizontal Field Angle (10%)	109.3
Vertical Field Angle (10%)	138.8
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	2960
Beam Efficiency	N.A.
Field Lumens	4198
Field Efficiency	N.A.
Spill Lumens	202
Luminaire Lumens	4400
Total Efficiency	N.A.
Total Luminaire Watts	30.453
Ballast Factor	1

ISOCANDELA CURVES



Axial Candela

	0	1	3	5	7	9	11	13	15	17	19.5	22.5	25.5	29	33	37.5	42.5	47.5	55	65	75	85	90
90	0.018	0.019	0.02	0.022	0.023	0.024	0.026	0.027	0.028	0.031	0.033	0.037	0.04	0.043	0.05	0.059	0.067	0.064	0.045	0.038	0.034	0.013	0
85	15.1	15.366	15.899	16.432	16.964	17.497	18.03	17.837	18.13	18.465	18.827	19.175	19.426	19.593	18.774	17.773	16.335	14.381	10.443	8.423	8.69	7.709	0.014
75	122.47	123.63	125.96	128.29	128.59	129.5	130.01	130.07	129.86	127.94	125.75	122.9	119.72	115.74	105.71	94.094	81.179	63.92	40.562	24.417	16.256	10.083	0.043
65	365.08	*365.385	*365.996	*363.891	*361.882	*358.991	*355.217	*350.624	*347.184	*343.321	*337.015	*325.265	*312.053	*289.445	*264.149	*234.397	*196.76	*139.62	78.556	43.499	24.952	12.721	0.07
55	753.85	*759.76	*771.573	*772.756	*773.891	*771.033	*765.353	*762.71	*766.208	*767.587	*764.531	*754.017	*729.993	*641.628	*551.528	*465.231	*349.009	*237.541	120.49	62.917	34.474	15.282	0.095
47.5	1396.46	*1399.603	*1405.882	*1395.528	*1387.024	*1374.772	*1359.337	*1339.312	*1318.183	*1295.621	*1268.606	*1233.744	*1124.154	*978.582	*822.747	*665.659	*475.18	*313.797	157.3	76.069	41.631	17.045	0.112
42.5	1764.89	*1760.023	*1750.302	*1728.869	*1709.208	*1686.206	*1659.475	*1632.436	*1600.115	*1561.748	*1517.122	*1438.508	*1308.22	*1156.141	*976.897	*776.681	*560.639	*363.849	183.21	83.875	46.206	18.184	0.122
37.5	1965.49	*1956.609	*1936.095	*1913.38	*1889.628	*1859.694	*1832.83	*1803.742	*1770.273	*1734.212	*1686.203	*1563.916	*1438.685	*1285.295	*1096.571	*883.609	*640.769	*419.965	208.78	89.931	50.44	19.403	0.131
33	2081.21	*2070.357	*2046.342	*2020.704	*1993.147	*1966.797	*1939.656	*1908.786	*1877.556	*1843.29	*1761.592	*1644.662	*1518.479	*1361.262	*1176.367	*959.665	*708.913	*468.892	226.04	95.692	53.934	20.261	0.139
29	2140.7	*2127.561	*2100.167	*2072.264	*2043.872	*2019.342	*1993.837	*1966.567	*1936.306	*1885.949	*1804.988	*1697.883	*1572.555	*1410.235	*1218.562	*1007.996	*756.934	*508.164	*236.398	101.76	56.717	21.076	0.145
25.5	2161.35	*2146.367	*2115.836	*2085.222	*2056.598	*2036.258	*2014.916	*1991.496	*1953.012	*1899.577	*1823.706	*1720.617	*1587.494	*1421.275	*1234.075	*1025.844	*782.949	*533.162	*238.491	106.94	58.917	21.725	0.149
22.5	2161.46	*2144.455	*2111.493	*2080.095	*2056.269	*2037.712	*2019.881	*1994.516	*1951.322	*1903.726	*1835.373	*1719.619	*1579.814	*1419.083	*1229.779	*1037.457	*797.971	*545.293	*236.77	*109.91	60.586	22.223	0.153
19.5	2131.12	*2112.2	*2077.24	*2044.909	*2027.714	*2013.985	*1999.79	*1967.14	*1932.72	*1893.123	*1822.227	*1700.244	*1562.534	*1394.305	*1230.464	*1044.877	*798.008	*549.021	*246.628	112.84	62.092	22.672	0.156
17	2091.65	*2071.273	*2035.187	*2004.95	*1986.981	*1974.643	*1955.503	*1928.893	*1900.022	*1863.342	*1786.233	*1671.493	*1539.912	*1383.215	*1227.024	*1039.931	*794.707	*545.537	*253.047	114.69	63.217	23.009	0.158
15	2052.78	*2032.336	*1996.626	*1967.774	*1947.365	*1931.595	*1912.521	*1891.549	*1864.831	*1823.925	*1754.481	*1643.018	*1520.948	*1374.771	*1217.737	*1035.25	*792.866	*555.642	*256.434	115.98	64.125	23.254	0.16
13	2017.35	*1996.712	*1960.62	*1929.758	*1907.113	*1891.969	*1874.539	*1854.038	*1824.813	*1786.579	*1721.285	*1615.032	*1501.01	*1361.812	*1203.613	*1027.168	*795.27	*563.539	*258.792	116.98	64.756	23.475	0.161
11	1984.57	*1963.468	*1926.385	*1892.63	*1870.114	*1858.779	*1842.735	*1818.827	*1789.757	*1752.205	*1689.012	*1588.776	*1475.404	*1339.896	*1187.366	*1021.335	*798.485	*569.11	*258.927	117.66	65.403	24.049	0.162
9	1960.2	*1938.286	*1899.364	*1863.567	*1844.268	*1831.712	*1812.752	*1788.191	*1758.716	*1721.772	*1659.403	*1558.473	*1445.19	*1313.602	*1173.42	*1021.176	*801.916	*571.89	*257.746	118.09	65.974	24.099	0.163
7	1940.9	*1917.746	*1878.439	*1842.436	*1819.164	*1806.227	*1787.754	*1761.036	*1732.92	*1693.942	*1629.615	*1524.711	*1415.433	*1298.072	*1163.056	*1019.093	*801.701	*572.003	*255.179	118.21	66.469	24.15	0.164
5	1924.09	*1901.304	*1862.546	*1821.767	*1799.793	*1785.038	*1767.069	*1738.581	*1706.704	*1666.498	*1603.414	*1506.566	*1404.36	*1283.822	*1151.211	*1009.211	*797.431	*569.306	*250.84	*118.04	67.124	24.202	0.165
3	1919.19	*1900.985	*1856.994	*1814.534	*1790.16	*1773.656	*1749.007	*1722.281	*1694.07	*1656.654	*1592.921	*1491.464	*1388.437	*1266.844	*1135.809	*997.842	*793.353	*566.928	*246.293	117.85	67.314	24.253	0.165
1	1928.69	*1909.562	*1864.579	*1822.354	*1795.203	*1777.824	*1755.078	*1724.03	*1690.72	*1648.052	*1579.436	*1472.535	*1368.304	*1246.399	*1117.409	*983.615	*778.768	*555.375	*237.655	116.98	67.505	24.33	0.165
0	1946.686	1915.79	*1871.73	*1827.07	*1799.83	*1780.83	*1755.54	*1722.71	*1686.75	*1641.13	*1569.54	*1459.75	*1355.58	*1233.7	*1106.49	*974.73	*771.46	*549.59	*233.33	*116.54	67.6	24.33	0.165
-1	1946.77	*1918.702	*1877.09	*1834.704	*1807.095	*1788.367	*1763.561	*1730.618	*1695.177	*1650.043	*1579.031	*1469.372	*1364.36	*1241.882	*1112.456	*979.547	*775.459	*552.979	*235.257	116.56	67.477	24.307	0.165
-3	1962.27	*1932.767	*1889.565	*1845.936	*1820.581	*1801.233	*1773.705	*1741.215	*1706.372	*1661.668	*1590.976	*1481.685	*1376.434	*1252.949	*1121.012	*985.62	*783.441	*559.747	*239.107	116.59	67.23	24.262	0.165
-5	1982.06	*1952.162	*1907.675	*1863.636	*1840.734	*1820.908	*1798.889	*1766.269	*1727.148	*1674.581	*1597.846	*1489.518	*1383.87	*1259.671	*1126.744	*988.792	*781.05	*557.332	*239.065	115.99	66.985	24.217	0.165
-7	2015.05	*1984.691	*1938.607	*1898.912	*1873.573	*1856.853	*1830.426	*1799.499	*1765.219	*1717.463	*1637.26	*1509.647	*1385.852	*1261.458	*1129.138	*990.455	*778.985	*555.252	*238.98	*115.41	66.279	24.172	0.164
-9	2063.63	*2034.555	*1988.195	*1947.571	*1925.201	*1906.025	*1883.081	*1850.692	*1807.262	*1763.542	*1687.866	*1566.043	*1434.256	*1271.98	*1130.242	*984.516	*773.484	*550.277	*237.401	114.63	65.736	24.127	0.163
-11	2125.73	*2097.718	*2053.54	*2012.925	*1988.128	*1968.084	*1948.313	*1913.584	*1870.208	*1818.772	*1739.104	*1620.048	*1488.449	*1322.103	*1150.832	*976.882	*764.812	*542.468	*234.808	113.63	65.119	24.083	0.162
-13	2181.65	*2155.638	*2112.036	*2077.256	*2055.071	*2032.134	*2007.908	*1983.445	*1937.327	*1881.236	*1794.225	*1669.986	*1537.359	*1368.133	*1188.002	*987.841	*756.42	*531.646	*231.264	112.47	64.431	23.514	0.161
-15	2226.17	*2202.043	*2159.63	*2127.414	*2107.512	*2091.291	*2062.502	*2036.711	*2003.206	*1941.115	*1847.673	*1718.252	*1579.266	*1405.088	*1220.662	*1011.177	*753.621	*517.96	*225.9	111.1	63.762	23.299	0.16
-17	2256.78	*2235.114	*2195.233	*2162.28	*2144.45	*2133.467	*2107.573	*2075.349	*2043.776	*1997.636	*1896.643	*1759.726	*1612.729	*1437.146	*1247.346	*1028.266	*760.606	*501.584	*220.17	109.48	62.831	23.06	0.158
-19.5	2272.07	*2253.627	*2217.356	*2182.369	*2166.427	*2154.417	*2142.214	*2104.59	*2066.493	*2026.059	*1944.837	*1794.298	*1636.891	*1462.794	*1272.016	*1045.295	*767.95	*501.276	*211.91	107.26	61.685	22.73	0.156
-22.5	2257.22	*2242.01	*2209.999	*2177.448	*2156.244	*2143.561	*2129.872	*2107.63	*2062.906	*2012.896	*1939.656	*1804.78	*1642.724	*1469.49	*1284.205	*1043.55	*766.813	*491.679	*200.54	104.04	60.179	22.288	0.153
-25.5	2213.26	*2200.258	*2171.081	*2139.764	*2110.629	*2098.151	*2083.081	*2064.356	*2025.59	*1970.055	*1889.808	*1774.068	*1623.548	*1450.205	*1259.819	*1030.711	*745.217	*473.465	*202.89	100.62	58.541	21.797	0.149
-29	2136.28	*2124.525	*2097.825	*2068.626	*2036.825	*2019.784	*2003.489	*1984.443	*1959.597	*1910.436	*1826.361	*1711.149	*1570.809	*1407.389	*1214.387	*989.897	*707.474	*444.649	*198.93	95.299	56.367	21.153	0.145
-33	2038.15	*2027.618	*2003.155	*1976.372	*1947.024	*1923.204	*1906.151	*1882.705	*1859.008	*1832.501	*1747.461	*1620.721	*1484.17	*1326.879	*1140.446	*913.92	*645.576	*402.773	*188.72	88.998	53.655	20.343	0.139
-37.5	1883.73	*1875.428	*1854.749	*1831.182	*1806.612	*1773.576	*1752.959	*1729.854	*1701.729	*1669.426	*1624.578	*1494.445	*1366.718	*1218.955	*1037.746	*817.677	*567.625	*350.538	*171.1	83.123	50.251	19.488	0.131
-42.5	1630.15	*1625.416	*1615.962	*1593.381	*1572.184	*1547.309	*1521.868	*1501.312	*1474.266	*1437.172	*1394.414	*1321.145	*1203.668	*1062.525	*898.251	*696.504	*480.806	*294.897	*150.79	77.463	46.227	18.268	0.122
-47.5	1298.01	*1299.07	*1301.187	*1290.204	*1281.124	*1268.527	*1252.666	*1231.274	*1206.899	*1180.253	*1143.968	*1098.148	*1003.608	*877.116	*732.339	*575.719	*392.621	*250.547	*131.69	70.708	41.937	17.124	0.112
-55	684.04	*691.78	*707.251	*711.654	*716.479	*717.76	*716.335	*714.485	*710.832	*707.069	*700.178	*689.46	*671.57	*581.594	*483.035	*383.883	*276.498	*191.47	*101.07	59.139	34.912	15.35	0.095
-65																							

LUMEN TABULATION

	0	1	3	5	7	9	11	13	15	17	20	23	26	29	33	38	43	48	55	65	75	85	90	Total
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.4	0.4	0.2	0.1	0	0	0
75	0.74 *	1.49 *	1.50 *	1.49 *	1.48 *	1.47 *	1.44 *	1.42 *	1.39 *	1.68 *	1.93 *	1.8	1.9	1.9	1.8	1.6	1.1	1	0.6	0.2	0.1	0	0	0
65	1.71 *	3.45 *	3.46 *	3.45 *	3.43 *	3.40 *	3.35 *	3.30 *	3.24 *	3.96 *	4.58 *	4.33 *	4.55 *	4.39 *	4.00 *	3.35 *	2.25 *	1.8	1	0.3	0.1	0	0	0
55	2.46 *	4.95 *	4.95 *	4.91 *	4.87 *	4.80 *	4.71 *	4.60 *	4.48 *	5.42 *	6.21 *	5.77 *	5.91 *	5.59 *	4.97 *	4.02 *	2.61 *	2.1	1	0.3	0.1	0	0	0
47.5	2.41 *	4.80 *	4.76 *	4.70 *	4.62 *	4.53 *	4.42 *	4.29 *	4.14 *	4.96 *	5.60 *	5.09 *	5.15 *	4.87 *	4.30 *	3.44 *	2.22 *	1.73 *	0.9	0.3	0.1	0	0	0
42.5	2.84 *	5.63 *	5.56 *	5.47 *	5.37 *	5.25 *	5.12 *	4.97 *	4.80 *	5.75 *	6.42 *	5.77 *	5.87 *	5.59 *	4.97 *	4.01 *	2.61 *	2.03 *	1	0.3	0.1	0	0	0
37.5	2.77 *	5.49 *	5.41 *	5.33 *	5.23 *	5.12 *	5.00 *	4.86 *	4.71 *	5.63 *	6.24 *	5.60 *	5.71 *	5.49 *	4.94 *	4.04 *	2.66 *	2.07 *	1	0.3	0.1	0	0	0
33	2.57 *	5.08 *	5.01 *	4.93 *	4.85 *	4.75 *	4.64 *	4.53 *	4.39 *	5.20 *	5.76 *	5.19 *	5.31 *	5.13 *	4.65 *	3.86 *	2.57 *	1.99 *	0.9	0.3	0.1	0	0	0
29	2.29 *	4.53 *	4.47 *	4.40 *	4.32 *	4.24 *	4.15 *	4.05 *	3.91 *	4.62 *	5.12 *	4.63 *	4.74 *	4.58 *	4.17 *	3.50 *	2.36 *	1.82 *	0.8	0.3	0.1	0	0	0
25.5	1.97 *	3.90 *	3.85 *	3.79 *	3.73 *	3.66 *	3.59 *	3.49 *	3.36 *	3.98 *	4.42 *	3.98 *	4.07 *	3.93 *	3.60 *	3.05 *	2.08 *	1.59 *	0.7	0.2	0.1	0	0	0
22.5	1.96 *	3.87 *	3.83 *	3.77 *	3.70 *	3.64 *	3.56 *	3.46 *	3.34 *	3.97 *	4.40 *	3.95 *	4.02 *	3.90 *	3.61 *	3.08 *	2.11 *	1.62 *	0.7	0.2	0.1	0	0	0
19.5	1.60 *	3.18 *	3.14 *	3.09 *	3.04 *	2.98 *	2.92 *	2.84 *	2.75 *	3.27 *	3.62 *	3.24 *	3.31 *	3.22 *	3.01 *	2.57 *	1.76 *	1.37 *	0.6	0.2	0	0	0	0
17	1.26 *	2.50 *	2.47 *	2.43 *	2.38 *	2.33 *	2.29 *	2.23 *	2.16 *	2.57 *	2.84 *	2.55 *	2.62 *	2.56 *	2.40 *	2.05 *	1.41 *	1.11 *	0.5	0.2	0	0	0	0
15	1.24 *	2.46 *	2.43 *	2.38 *	2.33 *	2.29 *	2.24 *	2.19 *	2.12 *	2.52 *	2.79 *	2.52 *	2.59 *	2.54 *	2.38 *	2.05 *	1.42 *	1.13 *	0.5	0.2	0	0	0	0
13	1.22 *	2.42 *	2.39 *	2.34 *	2.29 *	2.25 *	2.20 *	2.15 *	2.08 *	2.47 *	2.75 *	2.48 *	2.56 *	2.51 *	2.36 *	2.05 *	1.43 *	1.14 *	0.5	0.2	0	0	0	0
11	1.20 *	2.39 *	2.35 *	2.30 *	2.25 *	2.21 *	2.16 *	2.11 *	2.04 *	2.43 *	2.71 *	2.44 *	2.51 *	2.47 *	2.34 *	2.05 *	1.44 *	1.15 *	0.5	0.2	0	0	0	0
9	1.19 *	2.36 *	2.33 *	2.28 *	2.22 *	2.18 *	2.13 *	2.08 *	2.01 *	2.40 *	2.66 *	2.40 *	2.47 *	2.44 *	2.33 *	2.05 *	1.45 *	1.15 *	0.5	0.2	0	0	0	0
7	1.18 *	2.34 *	2.31 *	2.25 *	2.20 *	2.15 *	2.11 *	2.05 *	1.99 *	2.36 *	2.63 *	2.37 *	2.45 *	2.43 *	2.32 *	2.05 *	1.45 *	1.15 *	0.5	0.2	0	0	0	0
5	1.17 *	2.33 *	2.30 *	2.24 *	2.19 *	2.14 *	2.09 *	2.04 *	1.97 *	2.34 *	2.61 *	2.36 *	2.44 *	2.41 *	2.30 *	2.04 *	1.44 *	1.14 *	0.5	0.2	0	0	0	0
3	1.17 *	2.34 *	2.30 *	2.24 *	2.19 *	2.13 *	2.08 *	2.03 *	1.96 *	2.34 *	2.59 *	2.34 *	2.41 *	2.38 *	2.28 *	2.02 *	1.43 *	1.12 *	0.5	0.2	0	0	0	0
1	0.59 *	1.18 *	1.15 *	1.13 *	1.10 *	1.07 *	1.04 *	1.02 *	0.98 *	1.16 *	1.29 *	1.16 *	1.19 *	1.18 *	1.13 *	1.00 *	0.70 *	0.55 *	0.3	0.1	0	0	0	0
0																								

-1	0.59 *	1.18 *	1.16 *	1.13 *	1.10 *	1.07 *	1.05 *	1.02 *	0.98 *	1.17 *	1.29 *	1.16 *	1.20 *	1.18 *	1.13 *	1.00 *	0.70 *	0.55 *	0.3	0.1	0	0	0
-3	1.19 *	2.37 *	2.33 *	2.27 *	2.22 *	2.16 *	2.11 *	2.05 *	1.98 *	2.35 *	2.61 *	2.35 *	2.42 *	2.39 *	2.28 *	2.01 *	1.42 *	1.11 *	0.5	0.2	0	0	0
-5	1.20 *	2.40 *	2.35 *	2.30 *	2.24 *	2.18 *	2.13 *	2.08 *	2.00 *	2.38 *	2.64 *	2.38 *	2.45 *	2.41 *	2.30 *	2.03 *	1.43 *	1.12 *	0.5	0.2	0	0	0
-7	1.22 *	2.42 *	2.39 *	2.33 *	2.27 *	2.22 *	2.17 *	2.11 *	2.04 *	2.42 *	2.68 *	2.41 *	2.47 *	2.43 *	2.31 *	2.03 *	1.43 *	1.13 *	0.5	0.2	0	0	0
-9	1.24 *	2.47 *	2.44 *	2.38 *	2.33 *	2.28 *	2.23 *	2.17 *	2.10 *	2.50 *	2.76 *	2.47 *	2.51 *	2.45 *	2.32 *	2.03 *	1.42 *	1.12 *	0.5	0.2	0	0	0
-11	1.27 *	2.54 *	2.50 *	2.45 *	2.40 *	2.35 *	2.30 *	2.23 *	2.16 *	2.57 *	2.86 *	2.56 *	2.59 *	2.50 *	2.33 *	2.02 *	1.41 *	1.12 *	0.5	0.2	0	0	0
-13	1.31 *	2.61 *	2.58 *	2.52 *	2.47 *	2.42 *	2.37 *	2.31 *	2.23 *	2.65 *	2.95 *	2.65 *	2.69 *	2.58 *	2.36 *	2.01 *	1.40 *	1.10 *	0.5	0.2	0	0	0
-15	1.34 *	2.67 *	2.64 *	2.59 *	2.54 *	2.49 *	2.44 *	2.38 *	2.30 *	2.73 *	3.03 *	2.72 *	2.77 *	2.66 *	2.42 *	2.03 *	1.38 *	1.08 *	0.5	0.2	0	0	0
-17	1.36 *	2.71 *	2.68 *	2.64 *	2.59 *	2.54 *	2.49 *	2.43 *	2.36 *	2.80 *	3.10 *	2.78 *	2.83 *	2.72 *	2.46 *	2.04 *	1.37 *	1.06 *	0.5	0.2	0	0	0
-20	1.72 *	3.42 *	3.38 *	3.34 *	3.28 *	3.22 *	3.15 *	3.08 *	2.99 *	3.57 *	3.94 *	3.53 *	3.59 *	3.45 *	3.13 *	2.57 *	1.70 *	1.29 *	0.6	0.2	0	0	0
-23	2.07 *	4.10 *	4.06 *	4.00 *	3.94 *	3.88 *	3.80 *	3.70 *	3.59 *	4.29 *	4.77 *	4.27 *	4.35 *	4.18 *	3.77 *	3.09 *	2.03 *	1.52 *	0.7	0.2	0.1	0	0
-26	2.04 *	4.05 *	4.00 *	3.95 *	3.89 *	3.82 *	3.75 *	3.66 *	3.54 *	4.22 *	4.71 *	4.24 *	4.32 *	4.16 *	3.74 *	3.05 *	1.99 *	1.48 *	0.7	0.2	0.1	0	0
-29	2.31 *	4.59 *	4.54 *	4.47 *	4.40 *	4.33 *	4.25 *	4.15 *	4.01 *	4.78 *	5.33 *	4.82 *	4.93 *	4.74 *	4.25 *	3.45 *	2.22 *	1.67 *	0.8	0.2	0.1	0	0
-33	2.54 *	5.03 *	4.97 *	4.89 *	4.81 *	4.73 *	4.64 *	4.53 *	4.40 *	5.25 *	5.83 *	5.27 *	5.39 *	5.18 *	4.62 *	3.71 *	2.37 *	1.79 *	0.8	0.3	0.1	0	0
-38	2.68 *	5.32 *	5.25 *	5.17 *	5.08 *	4.98 *	4.87 *	4.75 *	4.62 *	5.54 *	6.16 *	5.53 *	5.65 *	5.41 *	4.79 *	3.80 *	2.40 *	1.83 *	0.9	0.3	0.1	0	0
-43	2.67 *	5.31 *	5.25 *	5.16 *	5.07 *	4.96 *	4.85 *	4.73 *	4.58 *	5.50 *	6.17 *	5.55 *	5.65 *	5.38 *	4.72 *	3.71 *	2.32 *	1.77 *	0.9	0.3	0.1	0	0
-48	2.23 *	4.45 *	4.41 *	4.34 *	4.27 *	4.19 *	4.09 *	3.99 *	3.86 *	4.64 *	5.26 *	4.79 *	4.85 *	4.59 *	4.01 *	3.14 *	1.95 *	1.5	0.8	0.3	0.1	0	0
-55	2.27 *	4.56 *	4.56 *	4.53 *	4.49 *	4.43 *	4.35 *	4.26 *	4.16 *	5.04 *	5.80 *	5.41 *	5.56 *	5.23 *	4.58 *	3.61 *	2.30 *	1.8	1	0.3	0.1	0	0
-65	1.48 *	3.00 *	3.02 *	3.02 *	3.01 *	2.98 *	2.94 *	2.91 *	2.89 *	3.57 *	4.19 *	4.04 *	4.27 *	4.08 *	3.63 *	2.97 *	2	1.7	0.9	0.3	0.1	0	0
-75	0.6	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.4	1.7	1.6	1.7	1.7	1.6	1.4	1	0.9	0.6	0.2	0.1	0	0
-85	0.18	0.37	0.38	0.38	0.38	0.38	0.37	0.37	0.36	0.44	0.51	0.48	0.53	0.54	0.52	0.46	0.35	0.34	0.22	0.09	0.03	0	0
-90	0.01	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.04	0.04	0.04	0.04	0.03	0.03	0.02	0.01	0.01	0	0
Total	67.3	134	133	130	128	126	123	120	117	139	156	142	145	140	128	107	71.6	56	26.8	8.66	2.01	0.06	2200.2

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	PIP30/D10	Sample ID.	C1
Temperature (°C)	25.4	Humidity (%RH)	54.0

Test Method

The samples were tested according to the ANSI C82.77:2002.

The total harmonic distortion shall be measured to the 40th order.

The ambient temperature condition was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

Test Results

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
120.02	60	0.254	30.4	0.996	5.81%
277.02	60	0.113	30.3	0.966	6.60%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2019/12/26	2020/12/25
DLF108	Auxiliary Lamp	2019/12/26	2020/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2019/12/26	2020/12/25
DLF116	AC Power Source	2019/12/26	2020/12/25
DLF113	Power Meter	2019/12/26	2020/12/25
DLF112	Temperature Recorder	2019/12/26	2020/12/25
DLF114	Temperature & Humidity Datalogger	2019/12/26	2020/12/25
DLF101	Goniophotometer	2019/12/26	2020/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2019/12/26	2020/12/25
DLF104	AC Power Source	2019/12/26	2020/12/25
DLF507	DC Power Source	2019/12/26	2020/12/25
DLF102	Power Meter	2019/12/26	2020/12/25
DLF111	Temperature & Humidity Datalogger	2019/12/26	2020/12/25
DLF119	Power Meter	2019/12/26	2020/12/25
DLF031	Temperature data logger	2019/12/26	2020/12/25
DLF022	Digital power meter	2019/12/26	2020/12/25
DLF003	Temperature & Humidity Datalogger	2019/12/26	2020/12/25

***** End of Test Report*****