

Scaled data based on original data using
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-
State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: HALO COMMERCIAL

Report Number: P776456

Luminaire Tested: HCDJBL3040CSD-HCD81TRMW-4000lm-3000K

Issue Date: 2/13/2024

Test Information

Test Method: LM-79-2019
Report Number: P776456
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (A2312156B044)
Test Lab:
Issue Date: 2/13/2024
Manufacturer: COOPER LIGHTING SOLUTIONS
Product Line: HALO COMMERCIAL
Catalog Number: HCDJBL3040CSD-HCD81TRMW-4000lm-3000K
Description: 8 INCH ROUND SHALLOW-WIDE MATTE WHITE TRIM
Light Source: SELECTABLE LUMENS AND CCT ARRAY 90CRI / 3000K CCT
Ballast/Driver: -

Summary

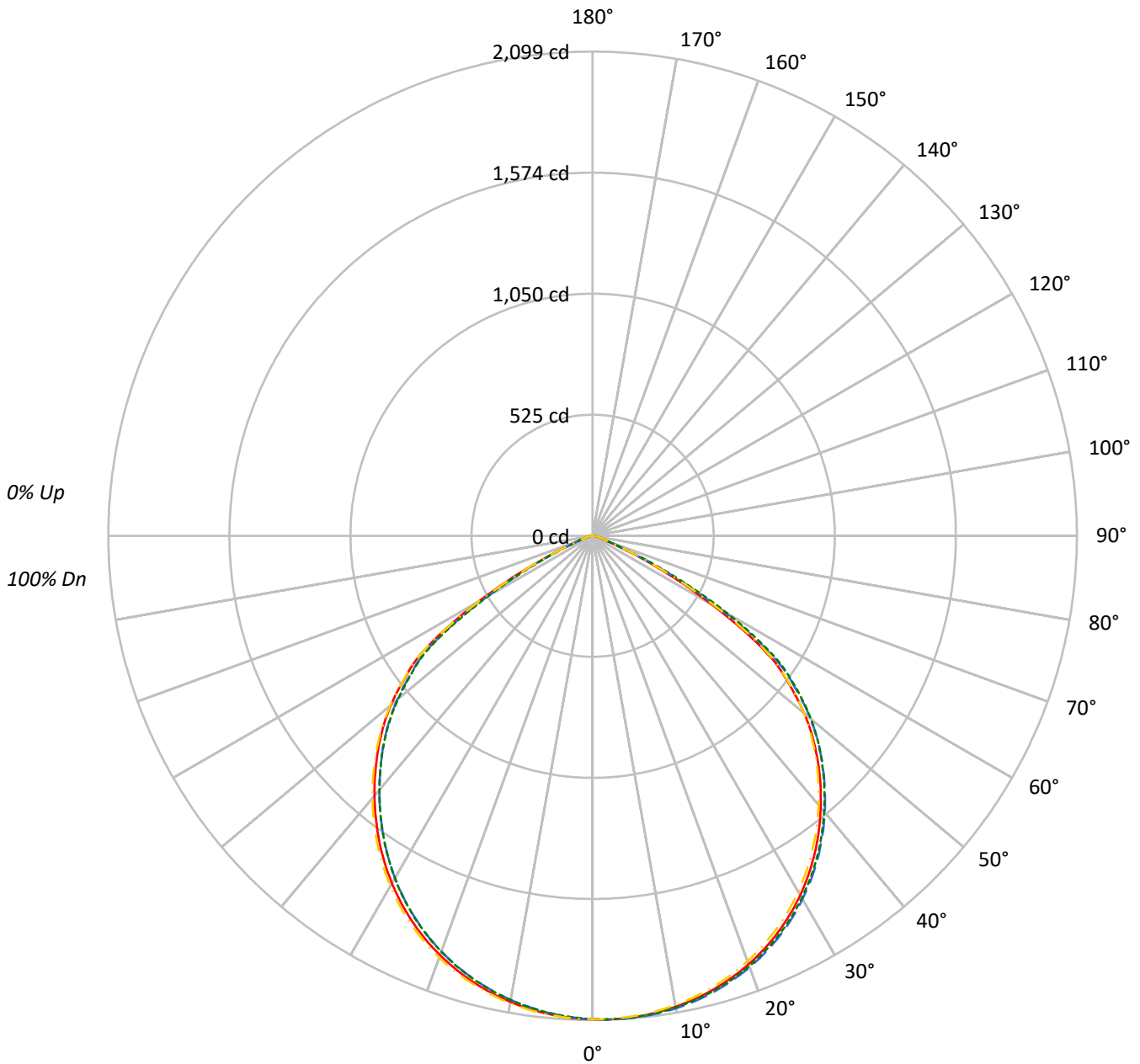
Lumens per Lamp: N/A
Luminaire Lumens: 4831.1 lumens
Efficiency: N/A
Efficacy: 125.5 lumens/watt
Spacing Criteria (0/90/45): 1.25 / 1.25 / 1.35
Luminous Opening: Circular (Dia: 0.67' x H: 0')
CIE Type: Direct

Input Watts (W): 38.5
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 24 FT



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Luminous Intensity Polar Plot





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COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:

RF	20					20					20					20										
RC	80					70					50					30					10					0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	0		
RCR																										
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100								
1	111	107	104	101	109	105	102	99	101	98	96	97	95	93	94	92	91	89								
2	103	96	90	85	100	94	89	84	91	86	83	87	84	81	85	82	79	77								
3	95	86	79	73	92	84	78	72	81	76	71	79	74	70	76	72	69	67								
4	87	77	69	63	85	75	68	63	73	67	62	71	65	61	69	64	60	58								
5	81	69	61	55	79	68	60	55	66	59	54	64	58	54	62	57	53	51								
6	75	62	54	48	73	62	54	48	60	53	48	58	52	47	57	51	47	45								
7	69	57	49	43	68	56	48	43	55	48	43	53	47	42	52	46	42	40								
8	65	52	44	39	63	51	44	38	50	43	38	49	43	38	48	42	38	36								
9	60	48	40	35	59	47	40	35	46	39	35	45	39	34	44	38	34	32								
10	57	44	37	32	55	44	36	32	43	36	31	42	36	31	41	35	31	29								

AVERAGE LUMINANCE (cd/sqm):

	0°	90°	180°	270°
0°	64004	64004	64004	64004
5°	64175	64199	63853	63684
10°	64275	64383	63618	63351
15°	64305	64491	63290	62921
20°	64219	64498	62858	62338
25°	63933	64331	62209	61522
30°	63417	63928	61334	60424
35°	62566	63241	60147	58981
40°	61304	62209	58622	57279
45°	59588	60805	56816	55296
50°	56811	58673	54194	52242
55°	51876	54399	49438	47357
60°	36685	41301	34939	31977
65°	18010	21549	16261	14672
70°	5731	6320	5766	5659
75°	4152	4659	4199	4294
80°	2883	3446	2883	3094
85°	1646	2347	1646	1927

MAXIMUM LUMINANCE 45°-90°:

Horizontal Angle: 67.5°
 Vertical Angle: 45°
 Luminance: 60939 cd/sqm



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ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	198.5	4.1
10°-20°	569.3	11.8
20°-30°	861.6	17.8
30°-40°	1027.0	21.3
40°-50°	1036.5	21.5
50°-60°	823.3	17.0
60°-70°	266.9	5.5
70°-80°	41.0	0.8
80°-90°	7.2	0.1
90°-100°	0.0	0.0
100°-110°	0.0	0.0
110°-120°	0.0	0.0
120°-130°	0.0	0.0
130°-140°	0.0	0.0
140°-150°	0.0	0.0
150°-160°	0.0	0.0
160°-170°	0.0	0.0
170°-180°	0.0	0.0
0°-30°	1629.3	33.7
0°-40°	2656.3	55.0
0°-60°	4516.1	93.5
0°-90°	4831.1	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	4831.1	100.0

CANDELA DISTRIBUTION:

	0°	90°	180°	270°	360°	Flux
0°	2096	2096	2096	2096	2096	
5°	2094	2095	2084	2078	2094	199
15°	2034	2040	2002	1991	2034	574
25°	1898	1910	1847	1826	1898	874
35°	1679	1697	1614	1582	1679	1049
45°	1380	1408	1316	1281	1380	1062
55°	975	1022	929	890	975	841
65°	249	298	225	203	249	270
75°	35	40	36	36	35	39
85°	5	7	5	6	5	6
90°	0	0	0	0	0	



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CANDELA DISTRIBUTION (FULL):

	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°	180°	202.5°	225°
0°	2096.4	2096.4	2096.4	2096.4	2096.4	2096.4	2096.4	2096.4	2096.4	2096.4	2096.4
0.5°	2097.6	2097.2	2097.2	2097.6	2095.6	2096.0	2096.8	2096.8	2096.4	2095.6	2095.2
1°	2097.6	2097.6	2097.9	2098.3	2096.4	2096.4	2096.4	2096.4	2095.6	2094.4	2094.0
1.5°	2097.9	2097.9	2098.3	2098.7	2096.8	2096.4	2096.4	2096.0	2094.4	2093.2	2092.5
2°	2097.6	2097.9	2098.7	2099.1	2097.2	2096.4	2096.0	2095.2	2093.6	2091.7	2090.9
2.5°	2097.2	2097.9	2098.7	2099.1	2097.2	2096.4	2095.2	2094.0	2092.1	2090.5	2089.3
3°	2097.2	2097.9	2098.7	2099.1	2096.8	2096.0	2094.8	2092.9	2090.9	2088.5	2087.8
3.5°	2096.4	2097.6	2098.3	2099.1	2096.8	2095.2	2093.6	2091.7	2089.3	2086.6	2085.4
4°	2096.0	2097.2	2097.9	2098.3	2096.4	2094.8	2092.5	2090.1	2087.4	2084.6	2083.5
4.5°	2094.8	2096.4	2097.6	2097.9	2095.6	2093.6	2091.3	2088.5	2085.4	2082.3	2080.7
5°	2094.0	2095.6	2097.2	2097.2	2094.8	2092.9	2089.7	2086.6	2083.5	2079.9	2078.4
5.5°	2092.9	2094.4	2096.0	2096.4	2093.6	2091.7	2088.2	2084.6	2080.7	2077.2	2075.6
6°	2091.3	2093.2	2094.8	2095.2	2092.5	2090.1	2086.2	2082.7	2078.4	2074.5	2072.9
6.5°	2089.7	2092.1	2093.6	2094.0	2091.3	2088.5	2084.2	2080.3	2075.6	2071.3	2069.8
7°	2087.8	2090.5	2092.5	2092.5	2089.7	2086.6	2082.3	2078.0	2072.9	2068.2	2066.2
7.5°	2085.8	2088.5	2090.9	2090.9	2088.2	2084.6	2080.3	2074.9	2069.8	2065.1	2063.1
8°	2083.9	2086.6	2088.9	2089.3	2086.2	2082.7	2077.6	2072.1	2066.6	2061.5	2059.2
8.5°	2081.1	2084.6	2087.0	2087.0	2084.2	2079.9	2074.9	2069.0	2063.1	2058.0	2055.7
9°	2078.8	2082.7	2085.0	2085.0	2081.9	2077.6	2071.7	2065.8	2059.6	2054.1	2051.8
9.5°	2076.0	2079.9	2082.7	2082.7	2079.5	2075.2	2069.0	2062.3	2056.1	2050.2	2047.5
10°	2073.3	2077.6	2079.9	2079.9	2076.8	2072.1	2065.8	2058.8	2052.1	2045.9	2043.1
10.5°	2070.2	2074.9	2077.2	2077.2	2074.1	2069.0	2062.7	2054.9	2047.8	2041.6	2038.4
11°	2067.0	2071.7	2074.5	2074.5	2070.9	2065.8	2058.8	2051.0	2043.5	2036.9	2033.8
11.5°	2063.5	2068.6	2071.3	2071.3	2067.8	2062.3	2054.9	2047.1	2039.2	2032.2	2029.1
12°	2060.0	2065.5	2068.2	2068.2	2064.3	2058.8	2051.0	2042.4	2034.5	2027.5	2024.0
12.5°	2056.5	2061.9	2064.7	2064.7	2061.2	2054.9	2047.1	2038.1	2029.4	2022.0	2018.5
13°	2052.1	2058.0	2061.2	2060.8	2057.2	2051.0	2042.8	2033.4	2024.4	2016.9	2013.4
13.5°	2047.8	2053.7	2057.2	2056.8	2053.3	2046.7	2038.4	2028.3	2019.3	2011.4	2007.5
14°	2043.5	2049.8	2053.3	2052.9	2049.0	2042.4	2033.8	2023.6	2013.8	2006.0	2001.7
14.5°	2039.2	2045.5	2049.4	2048.6	2045.1	2037.7	2028.7	2018.1	2008.3	2000.1	1995.8
15°	2034.5	2041.6	2045.1	2044.3	2040.4	2033.4	2023.6	2012.6	2002.4	1993.8	1989.9
15.5°	2029.4	2036.5	2040.4	2039.6	2035.7	2028.3	2018.5	2007.5	1996.6	1988.0	1983.3
16°	2024.4	2031.8	2035.7	2034.5	2030.6	2023.2	2013.0	2001.3	1990.3	1981.3	1976.6
16.5°	2019.3	2026.7	2030.6	2029.4	2025.9	2018.1	2007.5	1995.4	1984.0	1975.0	1970.0
17°	2013.4	2021.6	2025.5	2024.4	2020.8	2012.6	2001.7	1989.1	1977.8	1968.4	1962.9
17.5°	2007.9	2016.1	2020.4	2018.9	2015.4	2007.1	1995.4	1982.9	1970.7	1961.0	1955.9
18°	2002.0	2010.3	2014.6	2013.4	2009.9	2001.3	1989.5	1976.2	1964.1	1953.9	1948.4
18.5°	1996.2	2004.8	2009.1	2007.1	2004.0	1995.0	1983.3	1969.6	1957.0	1946.5	1941.0
19°	1989.5	1998.9	2002.8	2001.7	1997.7	1988.7	1976.6	1962.5	1949.6	1938.6	1933.2
19.5°	1983.3	1992.7	1997.0	1995.4	1991.5	1982.5	1970.0	1955.5	1942.2	1931.2	1925.3
20°	1976.6	1986.0	1990.7	1989.1	1985.2	1975.8	1962.9	1948.4	1934.7	1923.4	1917.1
20.5°	1970.0	1979.3	1984.0	1982.5	1978.6	1969.2	1955.9	1940.6	1926.5	1915.2	1908.9
21°	1962.5	1972.7	1977.0	1975.8	1971.5	1962.1	1948.0	1932.8	1918.7	1906.5	1900.3



TEST NUMBER: P776456

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CANDELA DISTRIBUTION (continued):

	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°	180°	202.5°	225°
22.5°	1940.2	1950.8	1955.9	1953.9	1950.0	1939.8	1924.9	1908.9	1893.2	1880.3	1873.7
23°	1932.0	1943.3	1948.0	1946.5	1942.6	1932.0	1917.1	1899.9	1884.2	1871.7	1864.3
23.5°	1924.2	1935.5	1940.6	1938.6	1934.3	1924.2	1908.5	1891.7	1875.2	1861.9	1854.9
24°	1915.5	1927.3	1932.4	1930.8	1926.5	1915.9	1899.9	1882.7	1866.2	1852.9	1845.1
24.5°	1906.9	1919.1	1924.2	1922.2	1918.3	1907.3	1891.3	1873.7	1856.4	1842.7	1834.9
25°	1897.9	1910.5	1915.5	1913.6	1909.7	1898.3	1882.7	1864.3	1846.7	1833.0	1824.7
25.5°	1889.3	1901.8	1906.9	1905.0	1901.1	1889.7	1873.7	1854.5	1837.3	1823.2	1814.6
26°	1880.3	1892.8	1897.9	1896.4	1892.1	1880.7	1864.3	1845.1	1827.1	1812.6	1804.4
26.5°	1870.9	1883.8	1889.3	1887.4	1882.7	1871.7	1854.5	1835.3	1816.9	1802.0	1793.4
27°	1861.1	1874.4	1879.5	1878.0	1873.3	1862.3	1845.1	1825.1	1806.3	1791.5	1782.5
27.5°	1851.4	1864.7	1870.5	1868.2	1864.3	1852.5	1834.9	1815.0	1795.8	1780.5	1771.5
28°	1841.2	1854.9	1860.8	1858.4	1854.5	1842.7	1824.7	1804.0	1784.8	1769.6	1760.6
28.5°	1831.0	1844.7	1850.6	1848.6	1844.3	1832.6	1814.6	1793.4	1773.9	1757.8	1748.8
29°	1820.8	1834.9	1840.4	1838.4	1834.1	1822.0	1803.6	1782.5	1762.9	1746.9	1737.1
29.5°	1809.9	1824.7	1830.2	1828.3	1824.0	1811.8	1793.0	1771.5	1751.2	1734.7	1725.3
30°	1798.9	1813.8	1819.3	1817.7	1813.4	1800.9	1782.1	1760.2	1739.8	1723.0	1713.2
30.5°	1788.3	1802.8	1808.7	1806.7	1802.8	1790.3	1771.1	1748.8	1727.7	1710.8	1700.7
31°	1776.6	1791.9	1797.7	1795.8	1791.5	1778.9	1759.4	1737.1	1715.9	1698.7	1688.5
31.5°	1765.2	1780.5	1786.4	1784.4	1780.5	1767.6	1748.0	1724.9	1703.8	1686.2	1676.0
32°	1753.5	1768.8	1775.0	1773.1	1769.2	1756.2	1736.3	1713.2	1691.3	1673.7	1663.5
32.5°	1741.4	1757.0	1763.7	1761.3	1757.4	1744.5	1724.1	1700.7	1678.7	1660.7	1649.8
33°	1729.6	1745.3	1751.9	1749.6	1746.1	1732.8	1712.0	1688.5	1665.8	1647.8	1637.3
33.5°	1717.1	1733.2	1739.8	1737.8	1733.9	1720.6	1699.5	1675.6	1653.3	1634.1	1623.6
34°	1704.2	1720.6	1727.7	1725.3	1721.4	1708.5	1687.4	1662.7	1640.0	1620.8	1610.2
34.5°	1691.7	1708.1	1715.1	1712.8	1708.9	1695.6	1674.4	1649.8	1626.7	1607.5	1596.2
35°	1678.7	1695.2	1702.6	1700.3	1696.8	1683.1	1661.5	1636.9	1613.8	1593.8	1582.9
35.5°	1665.4	1682.3	1689.7	1687.4	1683.8	1670.1	1648.2	1623.2	1600.1	1579.7	1568.8
36°	1652.1	1669.4	1676.4	1674.8	1671.3	1657.2	1635.3	1609.5	1586.0	1566.0	1554.7
36.5°	1638.4	1655.7	1663.1	1661.5	1657.6	1643.9	1622.0	1596.2	1572.3	1551.9	1540.6
37°	1624.7	1642.0	1649.8	1648.2	1644.7	1630.6	1608.3	1582.9	1557.8	1537.4	1526.5
37.5°	1611.0	1628.3	1636.5	1634.5	1631.0	1616.5	1594.6	1568.4	1543.7	1523.4	1511.6
38°	1596.6	1614.2	1622.4	1620.8	1617.3	1603.2	1580.5	1554.3	1529.6	1508.5	1497.1
38.5°	1582.5	1600.1	1608.3	1607.1	1603.2	1589.1	1566.4	1540.2	1515.1	1494.0	1482.3
39°	1568.0	1585.6	1594.2	1592.6	1589.5	1575.0	1552.3	1525.7	1500.7	1479.1	1467.8
39.5°	1553.1	1571.1	1579.7	1578.5	1575.4	1560.5	1537.4	1511.2	1485.8	1464.3	1452.9
40°	1538.2	1556.2	1565.6	1564.1	1560.9	1546.5	1523.0	1496.0	1470.9	1449.4	1437.6
40.5°	1523.4	1541.4	1550.4	1549.6	1546.5	1531.6	1508.1	1481.1	1456.0	1433.7	1422.8
41°	1507.7	1526.1	1535.5	1534.7	1531.2	1516.7	1493.2	1466.2	1440.8	1418.9	1407.1
41.5°	1492.0	1510.8	1520.2	1519.8	1516.7	1501.8	1478.3	1451.3	1425.9	1403.6	1391.8
42°	1476.8	1495.6	1505.4	1505.0	1501.8	1486.6	1463.1	1436.5	1410.2	1387.9	1376.2
42.5°	1461.1	1479.9	1490.1	1489.7	1486.6	1471.3	1447.8	1420.8	1394.6	1372.7	1360.9
43°	1445.5	1463.9	1474.4	1474.4	1471.7	1456.0	1432.6	1405.5	1379.3	1356.6	1345.3
43.5°	1429.4	1448.2	1458.8	1459.2	1456.0	1440.4	1416.9	1389.9	1363.7	1341.0	1329.6



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CANDELA DISTRIBUTION (continued):

	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°	180°	202.5°	225°
45°	1380.1	1398.9	1410.6	1411.4	1408.3	1392.6	1369.5	1342.9	1315.9	1292.8	1281.9
45.5°	1362.9	1382.1	1393.8	1395.4	1392.2	1376.2	1353.1	1326.1	1299.9	1276.8	1265.8
46°	1346.0	1365.6	1377.4	1378.9	1375.8	1359.7	1337.0	1310.0	1283.4	1260.3	1249.4
46.5°	1328.8	1347.6	1360.5	1362.1	1359.4	1343.3	1320.2	1293.6	1266.6	1243.9	1232.9
47°	1310.8	1330.4	1343.3	1345.3	1342.9	1326.1	1303.0	1276.4	1249.8	1227.1	1215.7
47.5°	1292.8	1312.4	1325.7	1328.0	1326.1	1308.9	1285.8	1259.2	1232.9	1209.4	1198.5
48°	1274.8	1294.0	1308.1	1310.4	1308.1	1291.6	1269.7	1242.3	1215.7	1192.2	1181.3
48.5°	1255.6	1275.2	1289.3	1292.4	1290.9	1274.4	1250.9	1224.7	1197.7	1174.6	1163.3
49°	1236.8	1256.8	1270.9	1274.8	1272.9	1255.6	1232.9	1206.3	1178.9	1155.8	1144.5
49.5°	1216.9	1237.2	1251.7	1255.6	1254.5	1237.2	1214.1	1187.5	1160.5	1137.0	1125.3
50°	1196.1	1216.9	1232.2	1236.5	1235.3	1218.5	1195.7	1168.7	1141.0	1117.5	1105.3
50.5°	1175.0	1195.4	1211.8	1215.7	1215.3	1199.3	1175.8	1148.4	1121.0	1096.7	1085.0
51°	1154.3	1174.6	1190.7	1195.7	1195.4	1178.1	1154.7	1127.6	1099.9	1076.0	1064.2
51.5°	1131.6	1152.3	1168.7	1174.2	1175.0	1157.4	1133.9	1106.5	1079.5	1056.0	1043.5
52°	1109.2	1130.8	1147.2	1152.7	1153.1	1135.9	1112.4	1084.6	1057.2	1034.1	1021.6
52.5°	1086.9	1107.7	1124.9	1130.0	1131.2	1113.6	1090.1	1062.7	1036.1	1012.6	1000.4
53°	1064.6	1085.0	1102.2	1108.5	1108.9	1091.6	1067.8	1040.8	1014.5	991.4	979.7
53.5°	1042.7	1062.3	1079.9	1085.8	1086.9	1070.1	1045.8	1020.0	994.2	971.9	960.5
54°	1021.6	1041.5	1058.4	1065.0	1065.4	1048.2	1025.1	999.3	974.6	951.9	940.2
54.5°	999.7	1020.0	1036.8	1043.5	1043.9	1027.8	1004.4	977.7	953.1	930.4	919.0
55°	974.6	994.6	1012.6	1019.6	1022.0	1004.7	981.3	954.3	928.8	906.5	895.1
55.5°	946.8	966.8	986.0	993.0	996.5	979.7	955.0	927.6	899.8	876.8	866.6
56°	914.3	937.0	954.6	962.1	968.0	951.5	925.3	895.5	867.4	845.0	834.1
56.5°	879.9	903.4	921.4	929.6	936.2	920.2	893.6	862.3	834.1	810.2	799.3
57°	843.1	866.2	886.1	894.8	902.6	885.0	858.4	827.4	798.1	774.2	762.5
57.5°	804.3	826.3	849.4	859.5	867.4	848.6	822.0	791.4	761.7	738.2	724.9
58°	764.0	786.3	811.4	823.5	831.3	810.2	782.8	753.1	724.5	700.2	686.9
58.5°	724.5	746.0	771.9	786.3	794.6	772.2	744.5	715.5	687.3	663.8	649.0
59°	682.6	706.1	732.7	748.4	755.4	730.8	703.8	675.6	648.6	625.5	609.8
59.5°	642.3	665.0	692.4	708.4	715.9	690.8	663.0	635.6	610.2	587.5	571.8
60°	600.8	625.5	652.1	669.3	676.4	650.5	622.3	594.9	572.2	550.3	535.1
60.5°	561.7	585.9	611.4	628.6	636.8	611.8	581.6	556.2	534.3	512.7	497.9
61°	522.1	547.2	570.7	587.9	595.7	572.2	542.1	515.9	495.9	476.7	461.9
61.5°	483.8	509.6	531.5	546.4	556.6	535.1	503.3	477.5	458.7	441.5	426.2
62°	446.6	471.3	493.2	506.1	517.8	495.9	465.8	439.6	422.3	407.1	392.6
62.5°	410.6	434.9	455.2	465.4	477.9	458.3	428.2	402.4	388.7	375.0	361.3
63°	375.8	398.8	418.0	426.6	439.9	421.5	395.3	369.1	355.0	342.9	329.6
63.5°	341.7	364.0	380.4	387.1	403.1	387.9	362.1	335.4	321.3	310.4	297.9
64°	308.8	329.6	345.2	350.3	368.3	353.8	328.8	301.8	287.7	278.3	266.5
64.5°	277.9	297.5	310.8	314.7	333.5	320.2	295.5	268.5	254.4	245.8	238.4
65°	249.3	266.2	277.5	281.0	298.3	286.1	262.6	239.1	225.1	217.6	212.5
65.5°	220.4	236.0	246.2	249.7	263.4	252.5	232.9	212.1	198.4	191.0	188.7
66°	191.0	207.1	215.7	219.2	231.3	221.5	205.9	187.5	173.0	166.7	166.3



TEST NUMBER: P776456

CATALOG NUMBER: HCDJBL3040CSD-HCD81TRMW-4000lm-3000K

CANDELA DISTRIBUTION (continued):

	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°	180°	202.5°	225°
67.5°	125.3	133.5	138.9	142.1	149.1	144.8	135.8	124.9	109.2	109.6	111.9
68°	110.8	118.2	124.5	127.2	127.2	123.3	116.2	108.8	94.3	96.3	98.2
68.5°	96.3	103.3	110.4	112.3	108.4	104.5	100.2	94.7	82.6	86.1	86.9
69°	82.2	88.5	96.3	97.9	92.8	89.2	87.3	83.0	74.0	77.5	77.5
69.5°	67.7	73.6	82.2	83.0	80.2	77.9	76.3	73.6	68.1	70.5	70.1
70°	64.2	66.5	68.1	68.1	70.8	69.7	68.5	66.9	64.6	65.0	65.4
70.5°	61.1	62.2	63.4	63.4	65.0	64.6	64.2	63.0	61.5	61.8	61.8
71°	57.5	59.1	60.3	60.3	61.5	61.5	61.1	59.9	58.3	58.7	59.1
71.5°	54.4	56.4	57.5	57.5	58.7	58.3	57.9	56.8	54.8	55.6	56.0
72°	51.3	53.2	54.4	54.4	55.6	55.6	55.2	54.0	52.1	52.8	53.2
72.5°	48.5	50.1	51.7	51.7	52.8	52.4	52.1	50.9	48.9	49.7	50.5
73°	45.4	47.4	48.5	48.9	50.1	49.7	49.3	48.1	46.2	47.0	47.8
73.5°	42.7	44.6	45.8	46.2	47.4	47.0	46.6	45.4	43.4	44.2	45.0
74°	40.3	41.9	43.4	43.4	44.6	44.2	44.2	42.7	40.7	41.5	42.3
74.5°	37.6	39.1	40.7	40.7	41.9	41.9	41.5	39.9	38.0	39.1	39.9
75°	35.2	36.8	38.4	38.4	39.5	39.1	39.1	37.6	35.6	36.4	37.6
75.5°	32.9	34.4	36.0	36.0	37.2	36.8	36.8	35.2	33.7	34.1	35.2
76°	30.5	32.1	33.7	33.7	34.8	34.8	34.4	32.9	31.3	32.1	33.3
76.5°	28.6	29.7	31.3	31.7	32.9	32.5	32.5	30.9	29.4	30.1	30.9
77°	26.6	27.8	29.4	29.7	30.5	30.5	30.1	29.0	27.0	27.8	29.0
77.5°	24.7	25.8	27.4	27.8	28.6	28.6	28.2	26.6	25.1	25.8	27.0
78°	22.7	23.9	25.4	25.8	26.6	26.6	26.2	24.7	23.1	23.9	24.7
78.5°	21.1	22.3	23.5	23.9	24.7	24.7	24.3	22.7	21.1	21.9	23.1
79°	19.6	20.4	21.9	22.3	22.7	22.7	22.3	20.7	19.6	20.0	21.1
79.5°	17.6	18.8	20.4	20.4	21.1	21.1	20.7	19.2	18.0	18.4	19.6
80°	16.4	17.2	18.4	18.8	19.6	19.6	19.2	17.6	16.4	16.8	18.0
80.5°	14.9	15.7	16.8	17.2	18.0	18.0	17.6	16.0	14.9	15.3	16.4
81°	13.3	14.1	15.7	16.0	16.4	16.4	16.0	14.5	13.3	13.7	14.9
81.5°	12.1	12.9	14.1	14.5	14.9	14.9	14.5	13.3	12.1	12.5	13.3
82°	11.0	11.7	12.9	12.9	13.7	13.7	13.3	11.7	11.0	11.0	12.1
82.5°	9.4	10.2	11.4	11.7	12.1	12.1	11.7	10.6	9.4	9.8	11.0
83°	8.2	9.0	10.2	10.6	11.0	11.0	10.6	9.4	8.2	8.6	9.8
83.5°	7.4	7.8	9.0	9.4	9.8	9.8	9.4	8.2	7.4	7.4	8.6
84°	6.3	6.7	7.8	8.2	8.6	8.6	8.2	7.0	6.3	6.7	7.4
84.5°	5.5	5.9	6.7	7.0	7.4	7.4	7.0	5.9	5.5	5.5	6.3
85°	4.7	5.1	5.9	6.3	6.7	6.7	6.3	5.1	4.7	4.7	5.5
85.5°	3.5	3.9	5.1	5.5	5.5	5.5	5.1	3.9	3.9	3.5	4.7
86°	3.1	3.1	4.3	4.3	4.7	4.7	4.3	3.1	3.1	2.7	3.9
86.5°	2.3	2.3	3.5	3.5	3.9	3.9	3.5	2.7	2.3	2.3	3.1
87°	1.6	2.0	2.7	3.1	3.1	3.1	2.7	2.0	1.6	1.6	2.3
87.5°	1.2	1.6	2.0	2.3	2.3	2.3	2.3	1.6	1.2	1.2	2.0
88°	0.8	1.2	1.6	1.6	2.0	2.0	1.6	1.2	0.8	0.8	1.2
88.5°	0.4	0.8	0.8	1.2	1.2	1.2	1.2	0.8	0.4	0.4	0.8



TEST NUMBER: P776456
CATALOG NUMBER: HCDJBL3040CSD-HCD81TRMW-4000lm-3000K

CANDELA DISTRIBUTION (continued):

	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°	180°	202.5°	225°
90°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



TEST NUMBER: P776456

CATALOG NUMBER: HCDJBL3040CSD-HCD81TRMW-4000lm-3000K

CANDELA DISTRIBUTION (continued):

	247.5°	270°	292.5°	315°	337.5°	360°
0°	2096.4	2096.4	2096.4	2096.4	2096.4	2096.4
0.5°	2095.6	2094.0	2094.8	2096.0	2097.2	2097.6
1°	2094.4	2092.9	2094.0	2095.6	2097.2	2097.6
1.5°	2093.2	2091.7	2092.9	2095.2	2097.2	2097.9
2°	2091.7	2090.5	2091.7	2094.4	2096.8	2097.6
2.5°	2090.1	2088.9	2090.5	2093.2	2096.0	2097.2
3°	2088.2	2087.0	2088.9	2092.1	2095.2	2097.2
3.5°	2086.2	2085.0	2087.4	2090.9	2094.4	2096.4
4°	2083.9	2083.1	2085.4	2089.3	2093.2	2096.0
4.5°	2081.5	2080.7	2083.5	2087.8	2092.1	2094.8
5°	2079.2	2078.0	2081.5	2085.8	2090.5	2094.0
5.5°	2076.0	2075.6	2079.2	2083.9	2088.9	2092.9
6°	2073.3	2072.9	2076.4	2081.9	2087.0	2091.3
6.5°	2070.5	2069.8	2073.7	2079.2	2085.0	2089.7
7°	2067.0	2066.6	2071.3	2076.8	2083.1	2087.8
7.5°	2063.9	2063.1	2068.2	2074.1	2080.7	2085.8
8°	2060.0	2059.6	2064.7	2070.9	2078.4	2083.9
8.5°	2056.5	2055.7	2061.2	2068.2	2075.2	2081.1
9°	2052.5	2051.8	2057.2	2064.7	2072.5	2078.8
9.5°	2048.2	2047.8	2053.7	2061.2	2069.4	2076.0
10°	2043.9	2043.5	2049.8	2057.6	2066.2	2073.3
10.5°	2039.2	2039.2	2045.5	2053.7	2062.7	2070.2
11°	2034.9	2034.5	2041.2	2049.8	2059.2	2067.0
11.5°	2029.8	2029.8	2036.5	2045.5	2055.7	2063.5
12°	2024.7	2024.7	2031.8	2041.2	2051.4	2060.0
12.5°	2019.7	2019.7	2027.1	2036.5	2047.5	2056.5
13°	2014.2	2014.2	2022.0	2031.8	2043.1	2052.1
13.5°	2008.3	2008.7	2016.5	2026.7	2038.4	2047.8
14°	2002.4	2002.4	2011.1	2021.6	2033.8	2043.5
14.5°	1996.6	1996.6	2005.6	2016.5	2028.7	2039.2
15°	1990.7	1990.7	1999.7	2011.1	2023.6	2034.5
15.5°	1984.0	1984.4	1993.0	2005.2	2018.5	2029.4
16°	1977.4	1977.8	1986.8	1999.3	2013.0	2024.4
16.5°	1970.7	1971.1	1980.5	1993.0	2007.1	2019.3
17°	1964.1	1964.5	1973.9	1986.8	2001.3	2013.4
17.5°	1956.3	1957.0	1967.2	1980.5	1995.4	2007.9
18°	1949.2	1950.0	1959.8	1973.9	1988.7	2002.0
18.5°	1941.8	1942.2	1952.7	1966.8	1982.5	1996.2
19°	1933.9	1934.7	1945.3	1959.8	1975.8	1989.5
19.5°	1926.1	1926.5	1937.5	1952.7	1969.2	1983.3
20°	1917.9	1918.7	1929.6	1945.3	1961.7	1976.6
20.5°	1909.3	1910.1	1921.8	1937.5	1954.7	1970.0
21°	1900.7	1901.5	1913.2	1929.6	1947.3	1962.5



TEST NUMBER: P776456

CATALOG NUMBER: HCDJBL3040CSD-HCD81TRMW-4000lm-3000K

CANDELA DISTRIBUTION (continued):

	247.5°	270°	292.5°	315°	337.5°	360°
22.5°	1873.7	1874.8	1887.8	1904.6	1923.8	1940.2
23°	1864.7	1865.4	1878.4	1896.0	1915.5	1932.0
23.5°	1854.9	1856.1	1869.4	1887.4	1906.9	1924.2
24°	1845.1	1846.3	1860.0	1878.0	1898.3	1915.5
24.5°	1835.3	1836.5	1849.8	1869.0	1889.3	1906.9
25°	1825.1	1826.3	1840.0	1859.2	1880.3	1897.9
25.5°	1814.6	1816.1	1830.2	1849.8	1870.9	1889.3
26°	1804.4	1805.6	1820.0	1839.6	1861.5	1880.3
26.5°	1793.4	1795.0	1809.9	1829.8	1851.4	1870.9
27°	1782.5	1784.0	1798.9	1819.3	1841.6	1861.1
27.5°	1771.5	1772.7	1787.9	1808.7	1831.4	1851.4
28°	1760.2	1761.3	1777.0	1798.1	1821.2	1841.2
28.5°	1748.4	1750.0	1766.0	1787.2	1810.7	1831.0
29°	1736.7	1738.2	1753.9	1776.2	1799.7	1820.8
29.5°	1724.5	1726.5	1742.5	1764.9	1788.7	1809.9
30°	1712.0	1714.0	1730.8	1753.1	1777.8	1798.9
30.5°	1699.9	1701.8	1718.3	1741.4	1766.0	1788.3
31°	1687.7	1689.3	1706.5	1729.6	1754.3	1776.6
31.5°	1674.8	1676.8	1694.0	1717.5	1742.5	1765.2
32°	1661.9	1663.5	1681.1	1705.4	1730.8	1753.5
32.5°	1648.6	1650.6	1668.2	1692.4	1718.7	1741.4
33°	1635.7	1637.6	1655.7	1679.9	1706.5	1729.6
33.5°	1622.4	1623.9	1642.0	1667.4	1693.6	1717.1
34°	1608.7	1610.2	1628.6	1654.1	1680.7	1704.2
34.5°	1594.6	1596.9	1615.3	1640.8	1667.8	1691.7
35°	1580.9	1582.5	1601.6	1627.5	1654.5	1678.7
35.5°	1567.2	1569.2	1587.5	1613.8	1641.2	1665.4
36°	1553.1	1554.7	1573.8	1600.1	1627.5	1652.1
36.5°	1538.6	1541.0	1559.8	1586.4	1614.2	1638.4
37°	1524.5	1526.5	1545.3	1572.3	1600.1	1624.7
37.5°	1509.7	1511.6	1530.8	1557.8	1586.0	1611.0
38°	1495.2	1496.7	1515.9	1543.3	1571.5	1596.6
38.5°	1480.7	1482.3	1501.4	1528.8	1557.0	1582.5
39°	1465.4	1467.4	1486.6	1514.4	1542.5	1568.0
39.5°	1450.6	1452.1	1471.7	1499.1	1528.1	1553.1
40°	1435.7	1437.2	1456.4	1484.2	1513.2	1538.2
40.5°	1420.4	1422.0	1440.8	1469.0	1498.3	1523.4
41°	1405.5	1406.7	1425.9	1453.7	1482.7	1507.7
41.5°	1389.9	1390.7	1409.8	1438.0	1467.4	1492.0
42°	1374.6	1375.8	1394.6	1423.2	1452.1	1476.8
42.5°	1359.4	1359.7	1378.9	1407.5	1436.1	1461.1
43°	1343.3	1344.5	1363.7	1391.5	1420.4	1445.5
43.5°	1327.7	1328.4	1347.2	1375.4	1404.4	1429.4



TEST NUMBER: P776456

CATALOG NUMBER: HCDJBL3040CSD-HCD81TRMW-4000lm-3000K

CANDELA DISTRIBUTION (continued):

	247.5°	270°	292.5°	315°	337.5°	360°
45°	1280.3	1280.7	1298.7	1326.9	1355.8	1380.1
45.5°	1264.2	1264.2	1282.3	1310.4	1338.6	1362.9
46°	1247.8	1247.4	1265.4	1293.6	1321.8	1346.0
46.5°	1231.4	1230.2	1248.6	1276.4	1304.6	1328.8
47°	1214.5	1213.8	1231.0	1258.8	1286.9	1310.8
47.5°	1196.9	1195.7	1212.6	1240.8	1268.9	1292.8
48°	1179.3	1177.7	1194.6	1222.4	1250.2	1274.8
48.5°	1161.3	1159.0	1176.2	1203.6	1231.4	1255.6
49°	1142.5	1140.2	1157.0	1184.0	1212.6	1236.8
49.5°	1123.3	1120.6	1137.0	1164.8	1192.6	1216.9
50°	1103.4	1099.9	1116.7	1143.7	1172.3	1196.1
50.5°	1083.0	1079.9	1095.9	1122.9	1150.7	1175.0
51°	1062.3	1058.8	1075.2	1102.2	1129.6	1154.3
51.5°	1041.1	1037.6	1053.3	1081.1	1108.1	1131.6
52°	1019.2	1016.5	1032.5	1059.1	1085.8	1109.2
52.5°	998.1	995.3	1011.4	1037.2	1062.3	1086.9
53°	977.7	975.4	991.0	1016.5	1041.5	1064.6
53.5°	957.8	956.2	971.9	996.5	1020.8	1042.7
54°	938.6	936.6	951.9	977.0	1000.4	1021.6
54.5°	917.1	914.7	930.4	954.6	978.1	999.7
55°	894.0	889.7	906.5	930.8	954.3	974.6
55.5°	866.6	859.9	876.8	901.0	924.9	946.8
56°	833.3	827.0	844.3	868.1	892.4	914.3
56.5°	798.5	791.8	808.6	833.7	857.2	879.9
57°	762.5	754.6	771.9	796.9	821.6	843.1
57.5°	724.9	715.9	734.7	759.7	783.6	804.3
58°	686.9	676.7	696.7	722.1	745.2	764.0
58.5°	647.4	638.4	658.3	684.2	703.4	724.5
59°	607.9	598.9	619.6	644.3	664.6	682.6
59.5°	569.1	561.7	581.6	605.9	624.7	642.3
60°	530.4	523.7	544.1	566.8	583.6	600.8
60.5°	492.8	486.5	506.5	527.6	542.5	561.7
61°	455.2	449.3	468.9	488.5	503.7	522.1
61.5°	420.4	415.3	432.9	451.3	465.8	483.8
62°	388.7	380.1	398.5	413.3	427.0	446.6
62.5°	357.4	347.2	364.0	376.9	391.0	410.6
63°	326.0	315.5	330.3	341.7	355.0	375.8
63.5°	294.7	284.9	298.6	308.0	321.3	341.7
64°	263.4	255.6	266.9	275.6	288.1	308.8
64.5°	237.2	229.0	237.6	245.4	258.3	277.9
65°	212.5	203.1	209.8	216.4	229.4	249.3
65.5°	189.4	180.0	183.6	189.8	202.4	220.4
66°	167.5	158.1	158.9	165.6	177.7	191.0



TEST NUMBER: P776456

CATALOG NUMBER: HCDJBL3040CSD-HCD81TRMW-4000lm-3000K

CANDELA DISTRIBUTION (continued):

	247.5°	270°	292.5°	315°	337.5°	360°
67.5°	114.3	112.7	111.9	117.0	120.9	125.3
68°	99.8	99.8	99.4	103.3	106.9	110.8
68.5°	87.7	86.9	86.9	89.6	93.2	96.3
69°	77.9	74.0	74.4	75.9	79.1	82.2
69.5°	70.1	67.3	67.7	68.9	70.5	67.7
70°	65.0	63.4	63.8	64.6	65.0	64.2
70.5°	61.8	60.7	61.1	61.5	61.5	61.1
71°	59.1	57.5	57.9	58.7	58.7	57.5
71.5°	56.0	54.8	55.2	55.6	55.6	54.4
72°	53.2	51.7	52.1	52.8	52.4	51.3
72.5°	50.1	48.9	49.3	50.1	49.7	48.5
73°	47.4	46.2	46.6	47.0	46.6	45.4
73.5°	45.0	43.8	43.8	44.6	43.8	42.7
74°	42.3	41.1	41.5	41.9	41.5	40.3
74.5°	39.9	38.7	39.1	39.5	38.7	37.6
75°	37.6	36.4	36.8	36.8	36.4	35.2
75.5°	35.2	34.1	34.4	34.8	34.1	32.9
76°	33.3	32.1	32.1	32.5	31.7	30.5
76.5°	30.9	29.7	30.1	30.1	29.4	28.6
77°	29.0	27.8	28.2	28.2	27.4	26.6
77.5°	27.0	25.8	26.2	26.2	25.4	24.7
78°	25.1	24.3	24.3	24.7	23.5	22.7
78.5°	23.1	22.3	22.7	22.7	21.9	21.1
79°	21.5	20.7	20.7	21.1	20.0	19.6
79.5°	20.0	19.2	19.2	19.2	18.4	17.6
80°	18.4	17.6	17.6	17.6	16.8	16.4
80.5°	16.8	16.0	16.0	16.0	15.3	14.9
81°	15.3	14.9	14.9	14.9	14.1	13.3
81.5°	13.7	13.3	13.7	13.3	12.5	12.1
82°	12.5	12.1	12.1	12.1	11.4	11.0
82.5°	11.4	11.0	11.0	11.0	9.8	9.4
83°	10.2	9.4	9.8	9.4	8.6	8.2
83.5°	9.0	8.6	8.6	8.2	7.4	7.4
84°	7.8	7.4	7.4	7.4	6.7	6.3
84.5°	6.7	6.3	6.7	6.3	5.5	5.5
85°	5.9	5.5	5.5	5.5	4.7	4.7
85.5°	5.1	4.7	4.7	4.7	3.5	3.5
86°	3.9	3.9	3.9	3.9	3.1	3.1
86.5°	3.5	3.1	3.1	3.1	2.3	2.3
87°	2.7	2.3	2.3	2.3	2.0	1.6
87.5°	2.0	1.6	1.6	1.6	1.6	1.2
88°	1.2	1.2	1.2	1.2	0.8	0.8
88.5°	0.8	0.4	0.4	0.4	0.4	0.4



TEST NUMBER: P776456
CATALOG NUMBER: HCDJBL3040CSD-HCD81TRMW-4000lm-3000K

CANDELA DISTRIBUTION (continued):

	247.5°	270°	292.5°	315°	337.5°	360°
90°	0.0	0.0	0.0	0.0	0.0	0.0



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— 0°-180° - - 45°-225° - - - - 90°-270° - · - 135°-315°

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21.5°	1955.1	1965.6	1970.3	1968.8	1964.5	1954.7	1940.6	1924.9	1910.5	1897.9	1891.7
22°	1947.6	1958.6	1962.9	1961.7	1957.4	1947.3	1932.8	1917.1	1902.2	1889.7	1882.7



44°	1413.0	1432.2	1442.7	1443.1	1440.0	1424.7	1401.2	1374.6	1347.6	1324.9	1314.0
44.5°	1396.5	1415.3	1426.3	1427.5	1424.7	1408.3	1385.2	1358.6	1332.0	1309.3	1297.9



66.5°	164.0	181.2	187.9	191.4	202.0	193.7	180.0	164.0	149.1	144.8	146.4
67°	139.7	156.2	162.0	165.2	175.0	168.3	156.6	143.6	127.2	125.6	128.0



89°	0.0	0.4	0.4	0.4	0.8	0.4	0.4	0.4	0.0	0.0	0.0
89.5°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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21.5°	1892.1	1893.2	1905.0	1921.8	1939.4	1955.1
22°	1883.1	1884.2	1896.4	1913.2	1931.6	1947.6



44°	1312.0	1312.8	1331.6	1359.7	1388.3	1413.0
44.5°	1296.3	1296.7	1315.1	1343.7	1372.3	1396.5



66.5°	148.0	138.9	137.4	144.0	156.2	164.0
67°	130.7	126.0	124.5	130.3	135.0	139.7

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89°	0.0	0.0	0.0	0.0	0.0	0.0
89.5°	0.0	0.0	0.0	0.0	0.0	0.0

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(END OF REPORT)