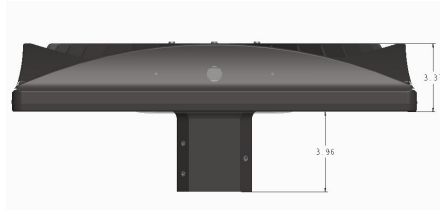


ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

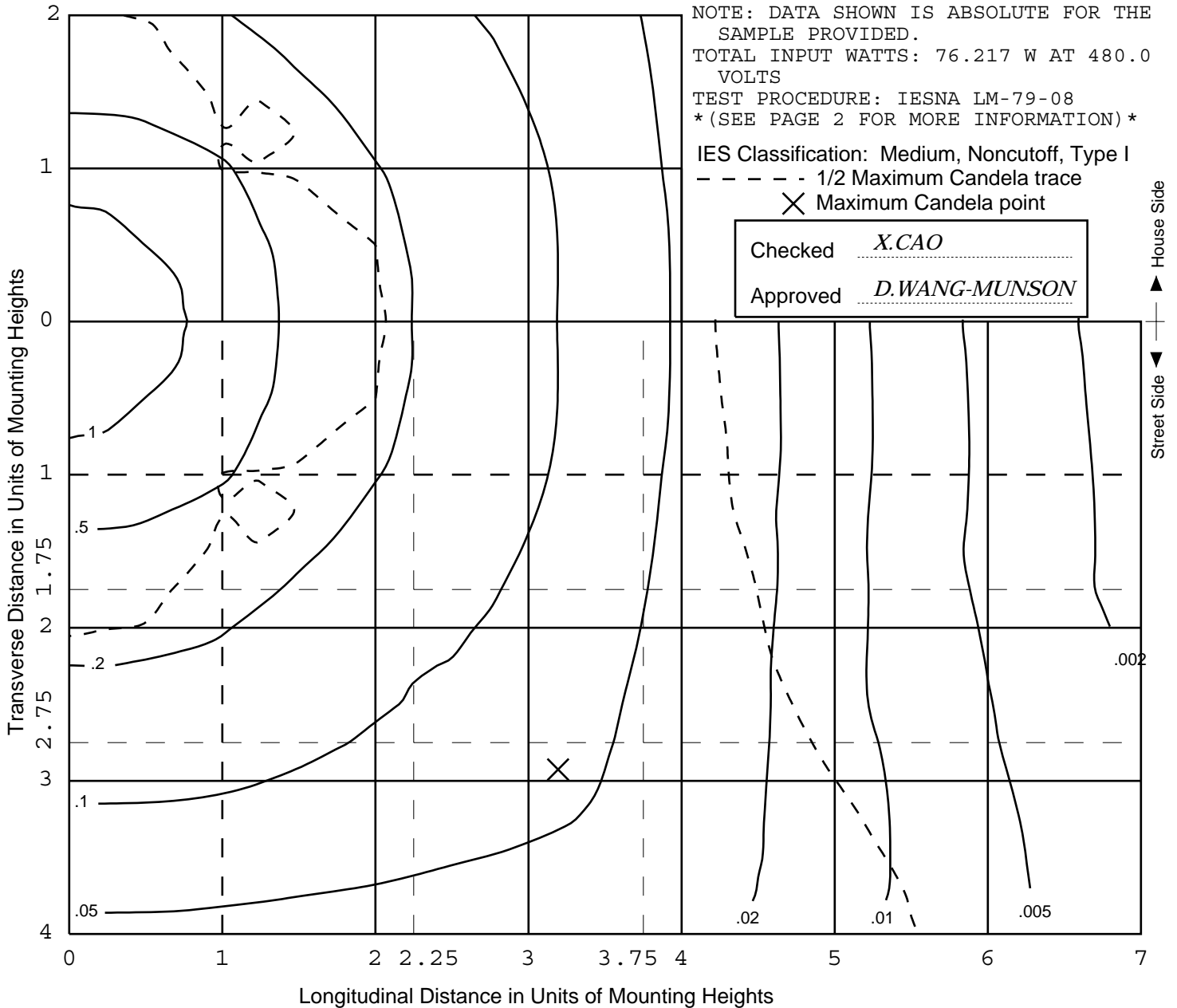
Values based on 25 foot mounting height.



REPORT NUMBER: RAB01410
 ISSUE DATE: 12/16/15 PAGE: 1 OF 9
 DATE SAMPLE TESTED: 12/16/15
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: ALED5S78/480/D10 (TYPE V Square)
 LUMINAIRE: CAST FINNED METAL HOUSING, 4 WHITE CIRCUIT BOARD WITH 11 LEDS, MOLDED 1-PIECE PLASTIC REFLECTOR WITH SPECULAR FINISH, CLEAR POLYCARBONATE LENS IN CAST BRONZE PAINTED METAL FRAME.
 LAMP: FORTY-FOUR WHITE LIGHT EMITTING DIODES (LEDs), TILTED 80-DEGREES FROM VERTICAL BASE-UP POSITION.
 NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.
 TOTAL INPUT WATTS: 76.217 W AT 480.0 VOLTS
 TEST PROCEDURE: IESNA LM-79-08
 (SEE PAGE 2 FOR MORE INFORMATION)

IES Classification: Medium, Noncutoff, Type I

--- 1/2 Maximum Candela trace
 X Maximum Candela point



REPORT NUMBER: RAB01410
ISSUE DATE: 12/16/15
PREPARED FOR: RAB LIGHTING INC.

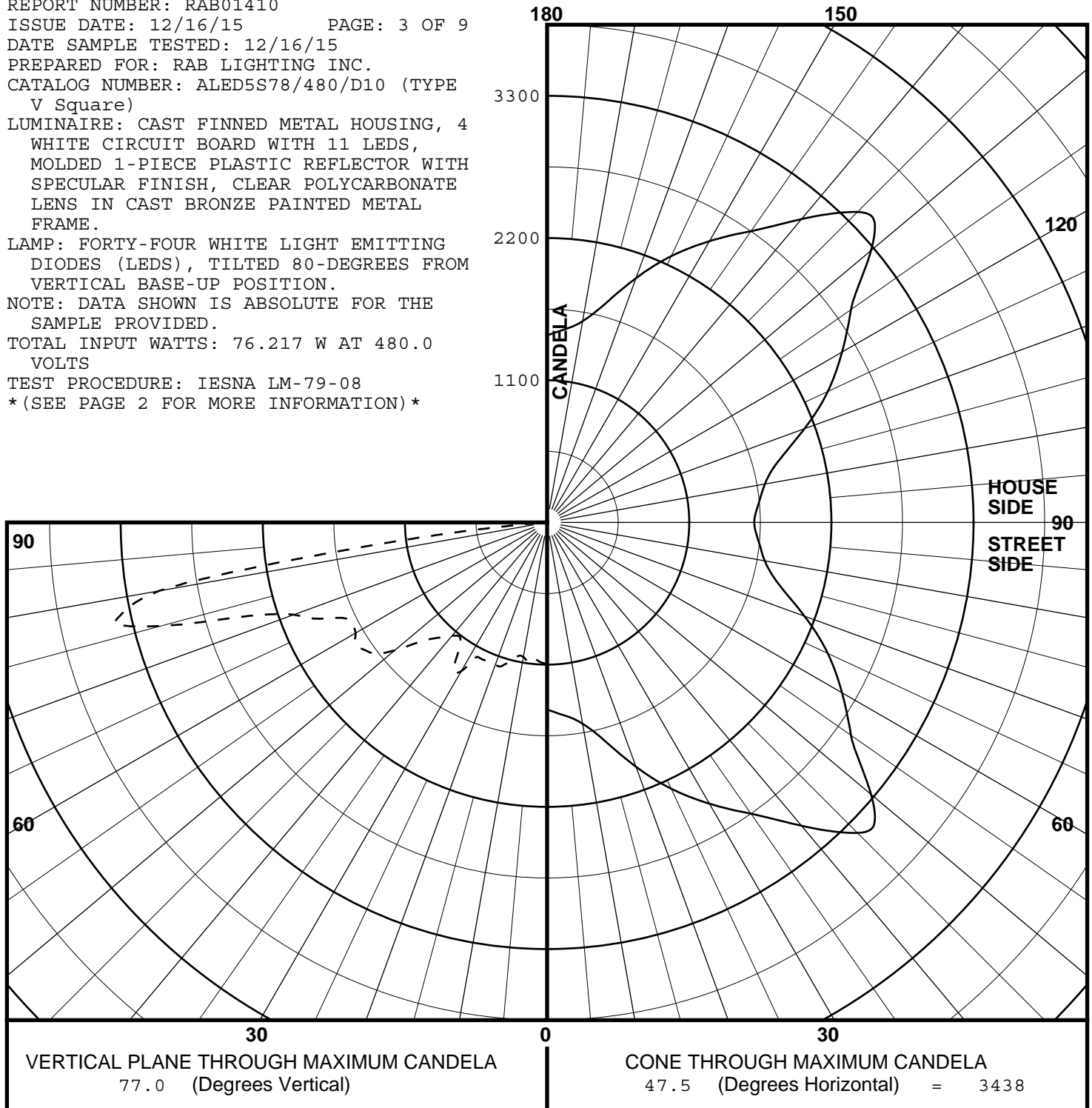
PAGE: 2 OF 9
DATE SAMPLE TESTED: 12/16/15

ADDITIONAL INFORMATION

TEST DISTANCE: 28.25 FEET
LED DRIVER: RDD-H100-A2000-480
ACCREDITED LABORATORY CODE 201085-0

MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

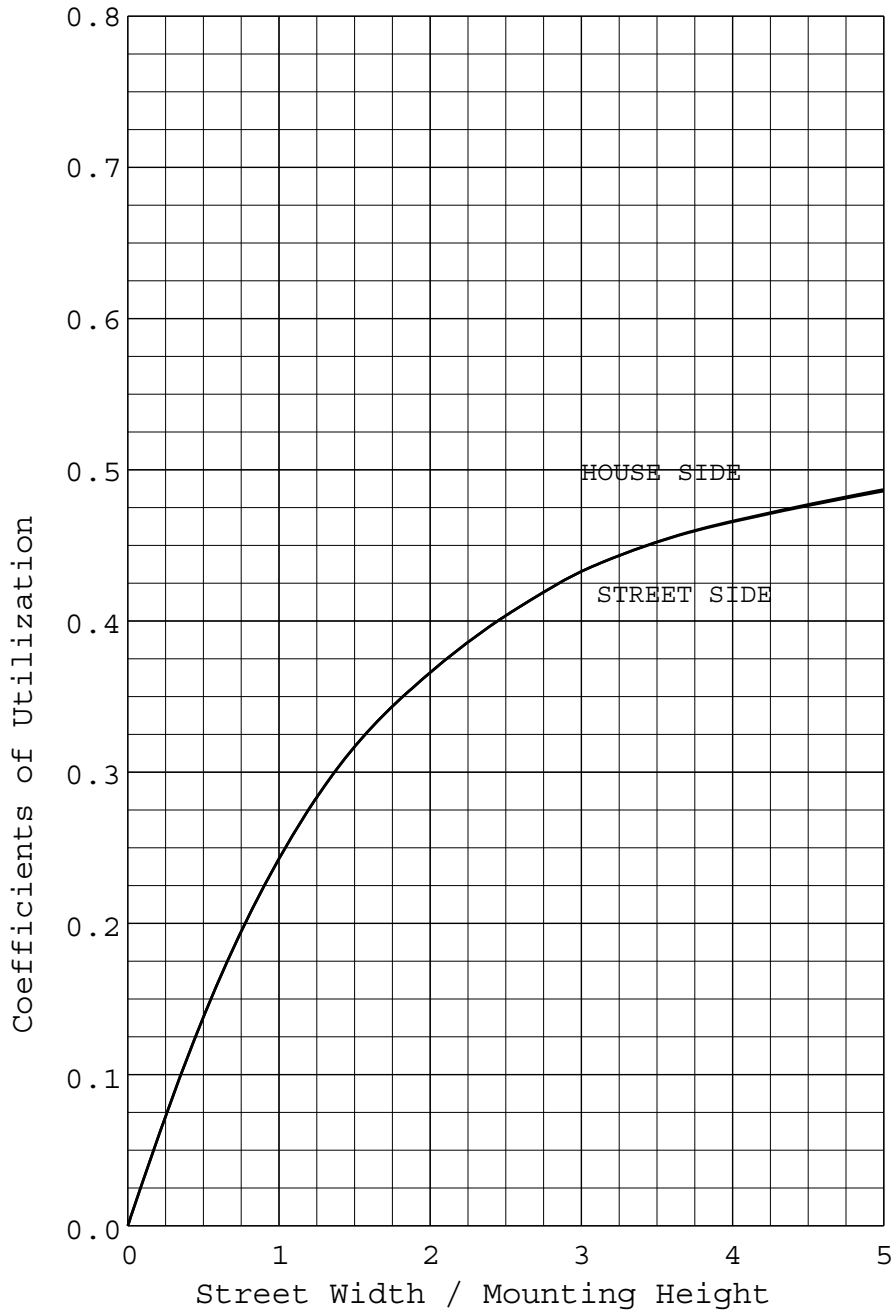
REPORT NUMBER: RAB01410
 ISSUE DATE: 12/16/15 PAGE: 3 OF 9
 DATE SAMPLE TESTED: 12/16/15
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: ALED5S78/480/D10 (TYPE V Square)
 LUMINAIRE: CAST FINNED METAL HOUSING, 4 WHITE CIRCUIT BOARD WITH 11 LEDS, MOLDED 1-PIECE PLASTIC REFLECTOR WITH SPECULAR FINISH, CLEAR POLYCARBONATE LENS IN CAST BRONZE PAINTED METAL FRAME.
 LAMP: FORTY-FOUR WHITE LIGHT EMITTING DIODES (LEDS), TILTED 80-DEGREES FROM VERTICAL BASE-UP POSITION.
 NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.
 TOTAL INPUT WATTS: 76.217 W AT 480.0 VOLTS
 TEST PROCEDURE: IESNA LM-79-08
 (SEE PAGE 2 FOR MORE INFORMATION)



REPORT NUMBER: RAB01410
ISSUE DATE: 12/16/15
PREPARED FOR: RAB LIGHTING INC.

PAGE: 4 OF 9
DATE SAMPLE TESTED: 12/16/15

COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	4446.	50.0
DOWNWARD HOUSE SIDE	4446.	50.0
DOWNWARD TOTAL	8893.	100.0
UPWARD STREET SIDE	0.	0.0
UPWARD HOUSE SIDE	0.	0.0
UPWARD TOTAL	0.	0.0
TOTAL FLUX	8893.	100.0
TOTAL INPUT WATTS = 76.2		
EFFICACY = 116.7 Lm/W		

ALL CANDELA AND LUMENS IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY.
THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE
LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

REPORT NUMBER: RAB01410
 ISSUE DATE: 12/16/15
 PREPARED FOR: RAB LIGHTING INC.

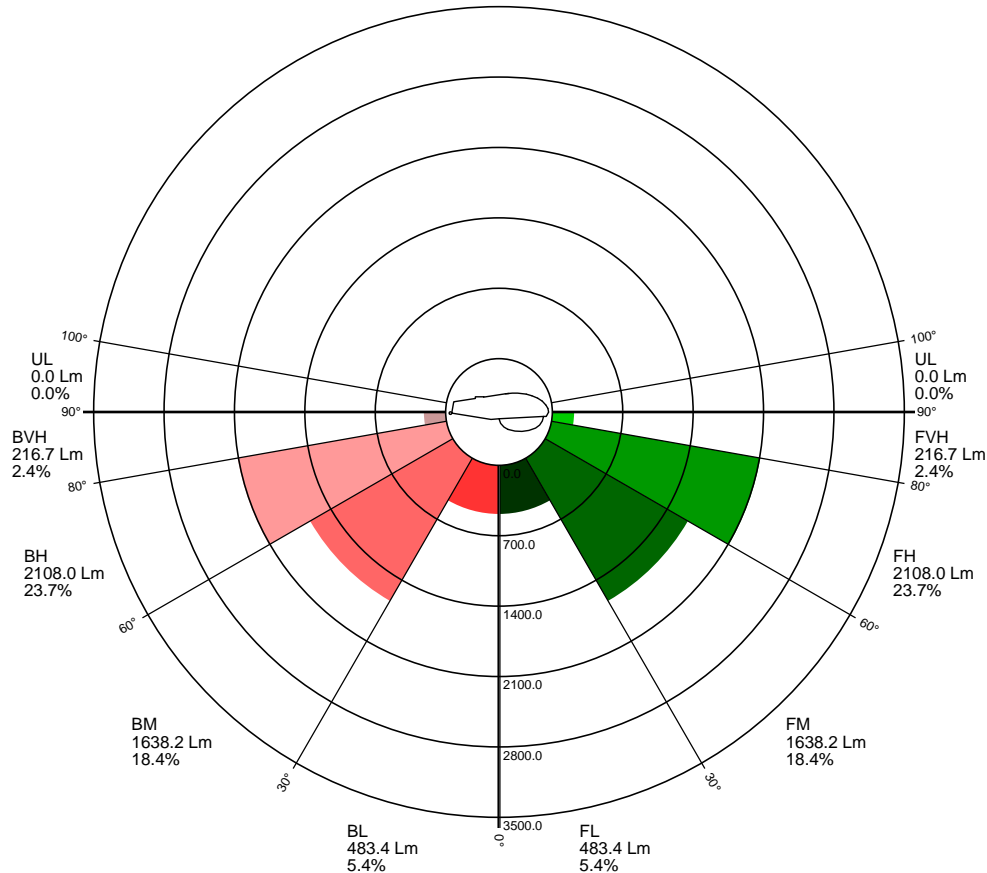
PAGE: 5 OF 9
 DATE SAMPLE TESTED: 12/16/15

BUG Rating:				B3 U0 G2		
Zonal Summary		Lumens	% of Fixture	Zone Ratings		
				B	U	G
Forward		4446	50.0			
FL	(0° - 30°)	483.4	5.4			
FM	(30° - 60°)	1638.2	18.4			
FH	(60° - 80°)	2108.0	23.7			G2
FVH	(80° - 90°)	216.7	2.4			G2
Backward		4446	50.0			
BL	(0° - 30°)	483.4	5.4	B1		
BM	(30° - 60°)	1638.2	18.4	B2		
BH	(60° - 80°)	2108.0	23.7	B3		G2
BVH	(80° - 90°)	216.7	2.4			G2
Upward		0	0.0			
UL	(90° - 100°)	0.0	0.0		U0	
UH	(100° - 180°)	0.0	0.0		U0	
Trapped Light		0	0.0			
Total Flux		8893	100.0			

Zonal Lumen Summary

(Linear scale)

UH
0.0 Lm
0.0%

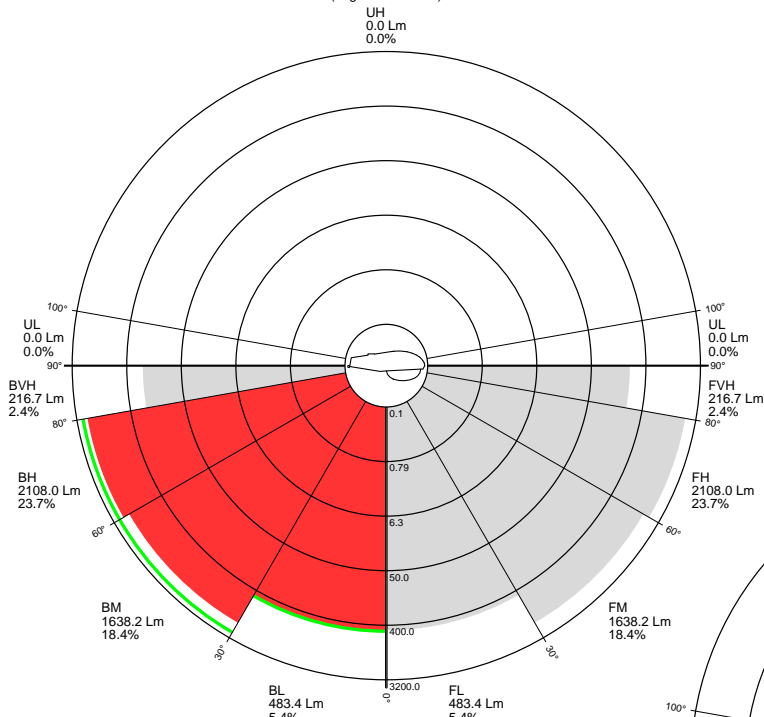


REPORT NUMBER: RAB01410
 ISSUE DATE: 12/16/15
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 6 OF 9
 DATE SAMPLE TESTED: 12/16/15

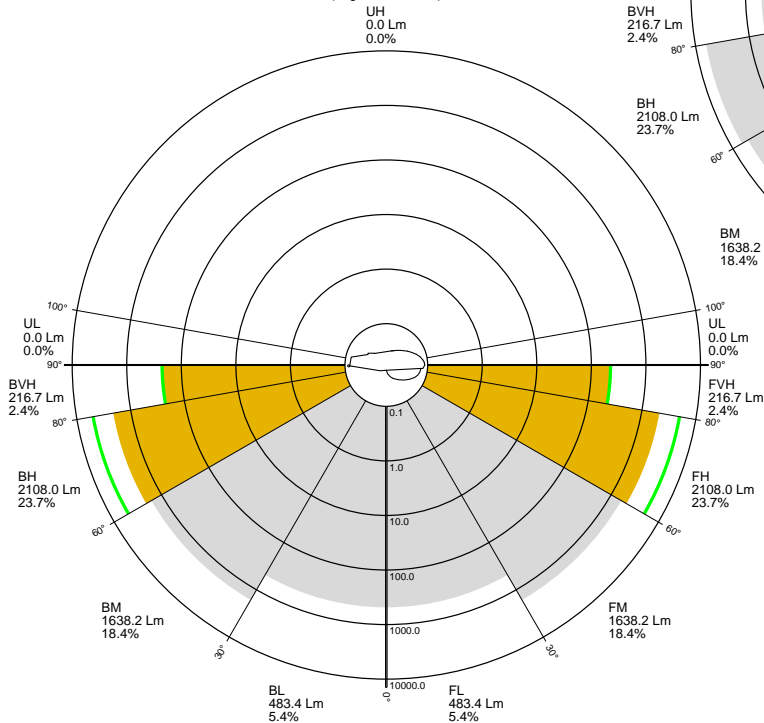
Backlight Rating Details

(Logarithmic scale)



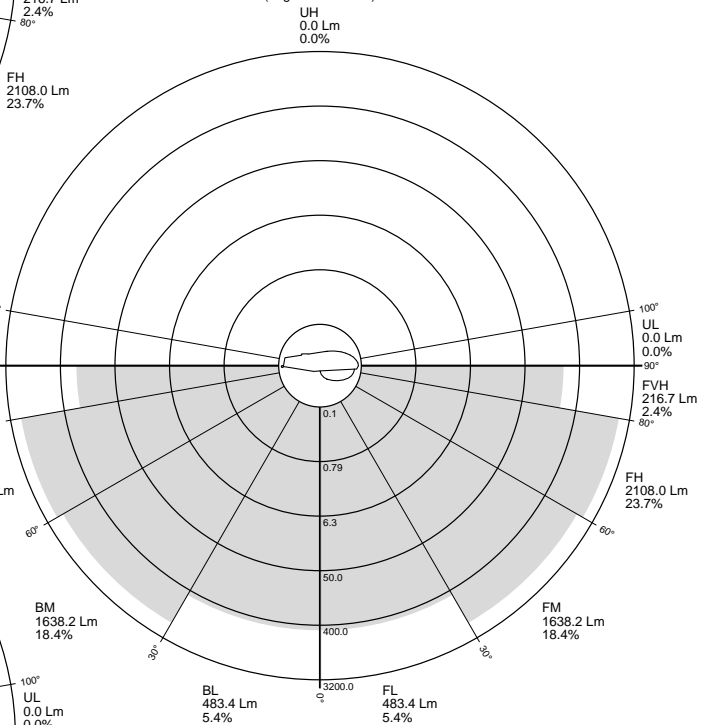
Glare Rating Details

(Logarithmic scale)



Uplight Rating Details

(Logarithmic scale)



REPORT NUMBER: RAB01410
 ISSUE DATE: 12/16/15
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 7 OF 9
 DATE SAMPLE TESTED: 12/16/15

CANDELA TABULATION

	STREET SIDE	LATERAL ANGLE										
		0.0	5.0	15.0	25.0	35.0	45.0	47.5	55.0	65.0	75.0	85.0
	180.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	175.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	165.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	155.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	145.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	135.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	125.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	115.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	105.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	95.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	90.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	87.5	6.	6.	6.	8.	14.	17.	18.	15.	9.	6.	6.
	85.0	17.	24.	55.	185.	274.	126.	272.	275.	208.	50.	25.
	82.5	75.	117.	301.	676.	1493.	1207.	1403.	1460.	806.	259.	117.
V	80.0	704.	741.	867.	1190.	2118.	3007.	3048.	2160.	1243.	857.	757.
E	77.5	1265.	1331.	1551.	2118.	2723.	3377.	3401.	2849.	2199.	1652.	1441.
R	77.0<<	1446.	1497.	1756.	2273.	2751.	3396.	3438.	2871.	2397.	1858.	1642.
T	75.0	2125.	2134.	2326.	2502.	2806.	3077.	3097.	2874.	2634.	2460.	2321.
I	72.5	2253.	2275.	2408.	2511.	2487.	2355.	2397.	2512.	2548.	2508.	2366.
C	70.0	2229.	2242.	2256.	2235.	2089.	2061.	2086.	2121.	2254.	2284.	2244.
A	67.5	1997.	2021.	2009.	2004.	1870.	1905.	1945.	1894.	1966.	1993.	2004.
L	65.0	1763.	1801.	1765.	1857.	1793.	1751.	1747.	1791.	1849.	1752.	1776.
	62.5	1631.	1644.	1656.	1771.	1799.	1657.	1699.	1759.	1760.	1652.	1641.
A	60.0	1570.	1570.	1655.	1687.	1742.	1671.	1711.	1752.	1673.	1639.	1562.
N	57.5	1549.	1528.	1629.	1587.	1713.	1716.	1758.	1705.	1601.	1672.	1522.
G	55.0	1481.	1466.	1542.	1579.	1638.	1732.	1722.	1635.	1585.	1541.	1482.
L	52.5	1454.	1462.	1496.	1584.	1598.	1673.	1669.	1601.	1587.	1504.	1449.
E	50.0	1460.	1482.	1538.	1592.	1481.	1494.	1539.	1521.	1597.	1542.	1475.
	47.5	1478.	1493.	1576.	1618.	1406.	1389.	1385.	1418.	1599.	1588.	1512.
	45.0	1449.	1456.	1507.	1549.	1310.	1255.	1275.	1286.	1570.	1517.	1465.
	42.5	1368.	1371.	1402.	1369.	1233.	1184.	1204.	1230.	1357.	1438.	1371.
	40.0	1303.	1288.	1326.	1223.	1202.	1155.	1144.	1176.	1238.	1299.	1241.
	37.5	1244.	1234.	1238.	1168.	1260.	1120.	1113.	1220.	1170.	1271.	1232.
	35.0	1192.	1177.	1147.	1178.	1217.	1144.	1182.	1232.	1153.	1185.	1188.
	30.0	1181.	1164.	1120.	1120.	1175.	1336.	1329.	1195.	1156.	1148.	1153.
	25.0	1167.	1173.	1188.	1243.	1183.	1165.	1172.	1161.	1273.	1206.	1194.
	20.0	1159.	1156.	1163.	1110.	1159.	1129.	1172.	1182.	1147.	1120.	1139.
	15.0	1115.	1116.	1109.	1135.	1120.	1134.	1112.	1148.	1092.	1092.	1119.
	10.0	1112.	1115.	1093.	1092.	1093.	1057.	1056.	1045.	1051.	1069.	1093.
	5.0	1066.	1069.	1083.	1062.	1058.	1055.	1059.	1055.	1062.	1096.	1080.
	0.0	1096.	1096.	1096.	1096.	1096.	1096.	1096.	1096.	1096.	1096.	1096.

||
 PLANE OF MAXIMUM CANDELA

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB01410
 ISSUE DATE: 12/16/15
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 8 OF 9
 DATE SAMPLE TESTED: 12/16/15

CANDELA TABULATION

HOUSE SIDE

LATERAL ANGLE

	90.0	95.0	105.0	115.0	125.0	135.0	145.0	155.0	165.0	175.0	180.0
180.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
175.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
165.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
155.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
145.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
135.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
125.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
115.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
105.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
95.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
90.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
87.5	6.	6.	6.	9.	15.	17.	14.	8.	6.	6.	6.
85.0	20.	25.	50.	208.	275.	126.	274.	185.	55.	24.	17.
82.5	83.	117.	259.	806.	1460.	1207.	1493.	676.	301.	117.	75.
V 80.0	714.	757.	857.	1243.	2160.	3007.	2118.	1190.	867.	741.	704.
E 77.5	1403.	1441.	1652.	2199.	2849.	3377.	2723.	2118.	1551.	1331.	1265.
R 77.0<<	1603.	1642.	1858.	2397.	2871.	3396.	2751.	2273.	1756.	1497.	1446.
T 75.0	2294.	2321.	2460.	2634.	2874.	3077.	2806.	2502.	2326.	2134.	2125.
I 72.5	2329.	2366.	2508.	2548.	2512.	2355.	2487.	2511.	2408.	2275.	2253.
C 70.0	2218.	2244.	2284.	2254.	2121.	2061.	2089.	2235.	2256.	2242.	2229.
A 67.5	1988.	2004.	1993.	1966.	1894.	1905.	1870.	2004.	2009.	2021.	1997.
L 65.0	1745.	1776.	1752.	1849.	1791.	1751.	1793.	1857.	1765.	1801.	1763.
62.5	1627.	1641.	1652.	1760.	1759.	1657.	1799.	1771.	1656.	1644.	1631.
A 60.0	1546.	1562.	1639.	1673.	1752.	1671.	1742.	1687.	1655.	1570.	1570.
N 57.5	1543.	1522.	1672.	1601.	1705.	1716.	1713.	1587.	1629.	1528.	1549.
G 55.0	1501.	1482.	1541.	1585.	1635.	1732.	1638.	1579.	1542.	1466.	1481.
L 52.5	1468.	1449.	1504.	1587.	1601.	1673.	1598.	1584.	1496.	1462.	1454.
E 50.0	1497.	1475.	1542.	1597.	1521.	1494.	1481.	1592.	1538.	1482.	1460.
47.5	1522.	1512.	1588.	1599.	1418.	1389.	1406.	1618.	1576.	1493.	1478.
45.0	1473.	1465.	1517.	1570.	1286.	1255.	1310.	1549.	1507.	1456.	1449.
42.5	1396.	1371.	1438.	1357.	1230.	1184.	1233.	1369.	1402.	1371.	1368.
40.0	1274.	1241.	1299.	1238.	1176.	1155.	1202.	1223.	1326.	1288.	1303.
37.5	1246.	1232.	1271.	1170.	1220.	1120.	1260.	1168.	1238.	1234.	1244.
35.0	1216.	1188.	1185.	1153.	1232.	1144.	1217.	1178.	1147.	1177.	1192.
30.0	1168.	1153.	1148.	1156.	1195.	1336.	1175.	1120.	1120.	1164.	1181.
25.0	1200.	1194.	1206.	1273.	1161.	1165.	1183.	1243.	1188.	1173.	1167.
20.0	1144.	1139.	1120.	1147.	1182.	1129.	1159.	1110.	1163.	1156.	1159.
15.0	1124.	1119.	1092.	1092.	1148.	1134.	1120.	1135.	1109.	1116.	1115.
10.0	1094.	1093.	1069.	1051.	1045.	1057.	1093.	1092.	1093.	1115.	1112.
5.0	1075.	1080.	1096.	1062.	1055.	1055.	1058.	1062.	1083.	1069.	1066.
0.0	1096.	1096.	1096.	1096.	1096.	1096.	1096.	1096.	1096.	1096.	1096.

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB01410
 ISSUE DATE: 12/16/15
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 9 OF 9
 DATE SAMPLE TESTED: 12/16/15

5-DEGREE ZONAL LUMEN SUMMARY

0- 5	26
5- 10	77
10- 15	131
15- 20	187
20- 25	247
25- 30	300
30- 35	346
35- 40	404
40- 45	494
45- 50	605
50- 55	675
55- 60	752
60- 65	834
65- 70	1003
70- 75	1262
75- 80	1118
80- 85	411
85- 90	22
90- 95	0
95-100	0
100-105	0
105-110	0
110-115	0
115-120	0
120-125	0
125-130	0
130-135	0
135-140	0
140-145	0
145-150	0
150-155	0
155-160	0
160-165	0
165-170	0
170-175	0
175-180	0

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	103
0- 20	421
0- 30	967
0- 40	1717
0- 50	2816
0- 60	4243
0- 70	6080
0- 80	8459
0- 90	8893
0-100	8893
0-110	8893
0-120	8893
0-130	8893
0-140	8893
0-150	8893
0-160	8893
0-170	8893
0-180	8893

REPORT NUMBER: RAB01411
DATE: 12/16/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: ALED5S78/480/D10 (TYPE V Square)

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: CAST FINNED METAL HOUSING, 4 WHITE CIRCUIT BOARD WITH 11 LEDS, MOLDED 1-PIECE PLASTIC REFLECTOR WITH SPECULAR FINISH, CLEAR POLYCARBONATE LENS IN CAST BRONZE PAINTED METAL FRAME.

LAMP: FORTY-FOUR WHITE LIGHT EMITTING DIODES (LEDs), TILTED 80-DEGREES FROM VERTICAL BASE-UP POSITION.

DRIVER: RDD-H100-A2000-480

OBJECT OF TEST: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT THE RATED INPUT VOLTAGES (480.0 AND 347.0 VAC, 60Hz) TO THE TEST SAMPLE.

INSTRUMENTS:	CHROMA PROGRAMMABLE AC POWER SOURCE MODEL 61602	Calibration Due: N/A
	CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202	3/9/16
	OCEAN OPTICS QE65PRO Spectroradiometer	11/10/16
	RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	11/10/16

OBJECT OF TEST: Measure the Absolute Flux in lumens*, Total Radiant Flux*, Spectral Power Distribution (SPD), Correlated Color Temperature (CCT), Color Rendering Indices (CRIa,1-14), Chromaticity Coordinates (x,y; u'v'), ANSI C78.377 Duv, and electrical data including ANSI C82.77-2002 Power Factor (PF), and Total Harmonic Distortion (THD) to the test sample. Measure electrical data including Total Harmonic Distortion (THD) at maximum nominal rated input voltage. Report Off-State Power.

PROCEDURE: The test sample was mounted inside the integrating sphere, energized, and allowed to stabilize. After stabilization occurred, measurements were taken. In order to measure mean performance, multiple data sets were recorded and averaged. Readings were taken with the test sample operating at 60 HZ input in a 25 +/-1 degree Celsius free air ambient and in accordance with IESNA LM-79-08. Electrical data was also recorded at maximum nominal rated input voltage (347.0 VAC). All data are traceable to the National Institute of Standards and Technology. Off-State Power was reported with no voltage applied to the sample.

*NOTE: Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even when these effects are compensated for, are likely to have a greater variation in results compared to the flux output calculated from a goniophotometric exploration since these artifacts do not affect the goniophotometric results.

RESULTS: (continued subsequent pages)

Checked	<u>X.CAO</u>
Approved	<u>D.WANG-MUNSON</u> Lighting Engineer

REPORT NUMBER: RAB01411
 DATE: 12/16/2015
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: ALED5S78/480/D10 (TYPE V Square)

Page 2 of 4

RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	8893 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3484
Chromaticity Ordinate y	0.3613
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2099
Chromaticity Ordinate v'	0.4898
Correlated Color Temp CCT (K)	4913
ANSI C78.377-2008 Duv	0.004
Total Radiant Flux (milliWatts)	26783 *
ELECTRICAL	
Input Voltage (Volts AC)	480.0
Input Current (Amps AC)	0.182
Input Power (Watts)	76.2
Input Power Factor (%)	87.2
Input Current THD (%)	14.5
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	116.7
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	347.0
Input Current (Amps AC)	0.224
Input Power (Watts)	74.6
Input Power Factor (%)	95.8
Input Current THD (%)	11.4
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	73
R1 Light greyish red	71
R2 Dark greyish yellow	76
R3 Strong yellowish green	80
R4 Moderate yellowish green	74
R5 Light bluish green	72
R6 Light blue	68
R7 Light violet	81
R8 Light reddish purple	60
R9 Strong red	-22
R10 Strong yellow	44
R11 Strong green	73
R12 Strong blue	46
R13 Light yellowish pink (skin)	71
R14 Moderate olive green (leaf)	89

*NOTE:

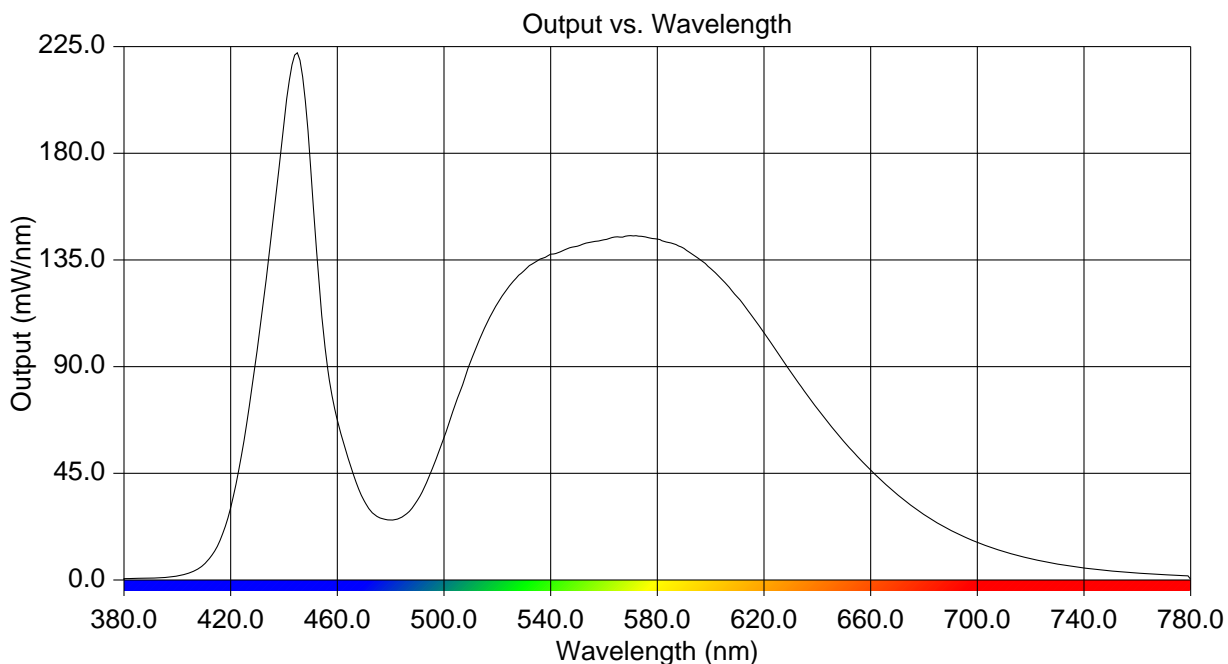
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even when these effects are compensated for, are likely to have a greater variation in results compared to the flux output calculated from a goniophotometric exploration since these artifacts do not affect the goniophotometric results.

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RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.552	515	105.868	650	58.313
385	0.650	520	116.635	655	52.142
390	0.772	525	124.850	660	46.496
395	1.075	530	130.447	665	40.956
400	1.712	535	134.642	670	36.105
405	3.167	540	137.464	675	31.553
410	6.663	545	139.167	680	27.647
415	14.191	550	140.807	685	24.047
420	30.480	555	142.563	690	20.985
425	58.717	560	143.536	695	18.273
430	97.408	565	144.780	700	15.872
435	142.373	570	145.285	705	13.737
440	193.942	575	144.855	710	11.943
445	222.418	580	143.834	715	10.373
450	173.863	585	142.255	720	9.007
455	102.286	590	139.892	725	7.788
460	67.487	595	135.940	730	6.754
465	48.072	600	131.400	735	5.858
470	33.547	605	125.924	740	5.067
475	26.757	610	119.385	745	4.427
480	25.285	615	112.129	750	3.851
485	27.141	620	104.302	755	3.344
490	33.566	625	96.089	760	2.908
495	45.216	630	87.895	765	2.550
500	60.078	635	79.874	770	2.225
505	76.584	640	72.280	775	1.955
510	92.264	645	65.178	780	0.297



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CIE Chromaticity Diagram

