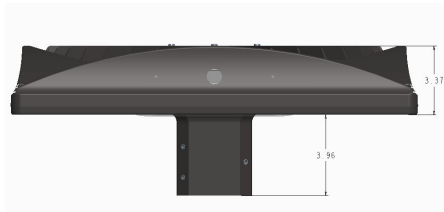


ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

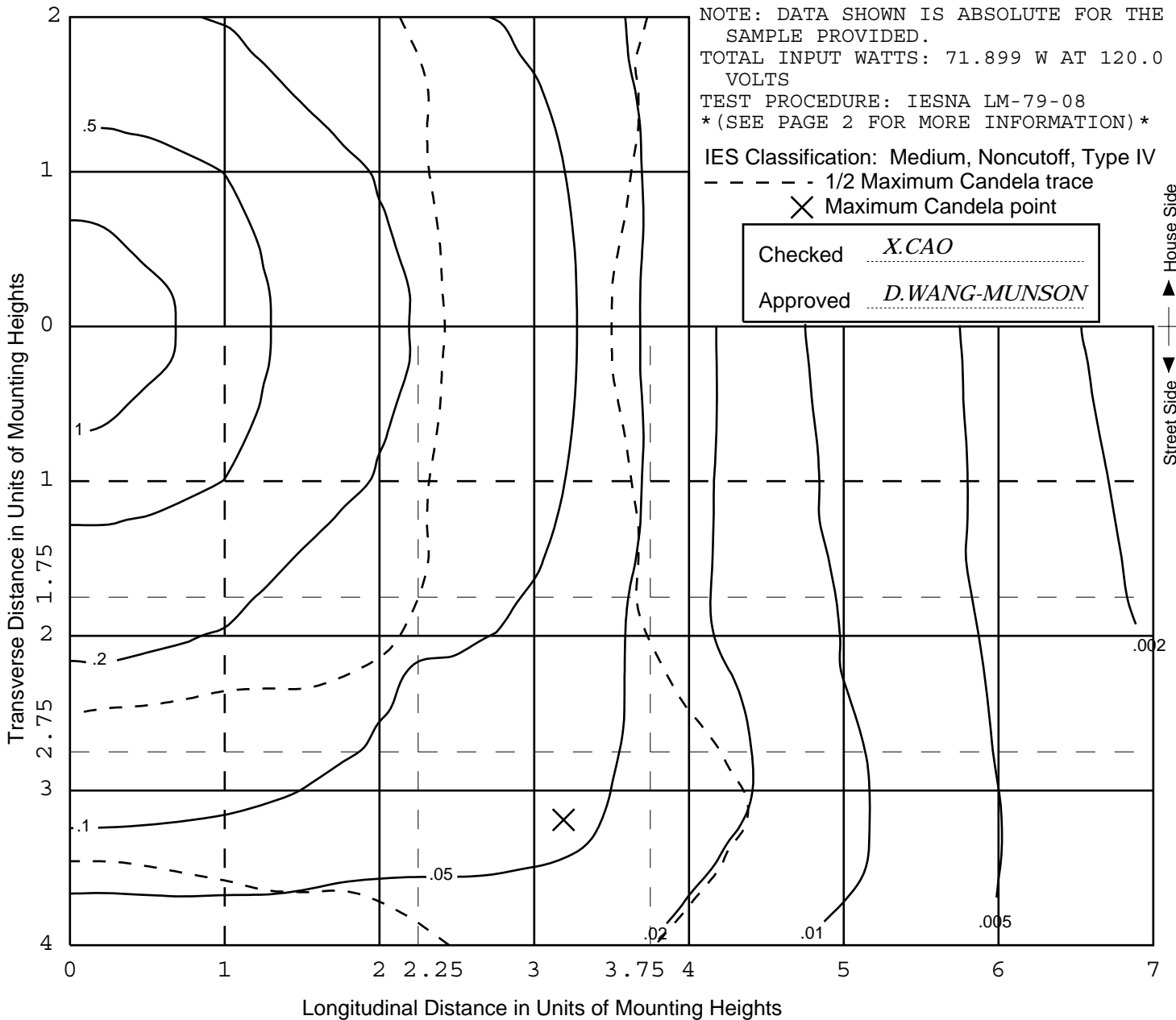
Values based on 25 foot mounting height.



REPORT NUMBER: RAB01406
 ISSUE DATE: 12/15/15 PAGE: 1 OF 9
 DATE SAMPLE TESTED: 12/15/15
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: ALED5S78N/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: 71.899 W AT 120.0 VOLTS
 TEST PROCEDURE: IESNA LM-79-08
 (SEE PAGE 2 FOR MORE INFORMATION)

IES Classification: Medium, Noncutoff, Type IV

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



REPORT NUMBER: RAB01406
ISSUE DATE: 12/15/15
PREPARED FOR: RAB LIGHTING INC.

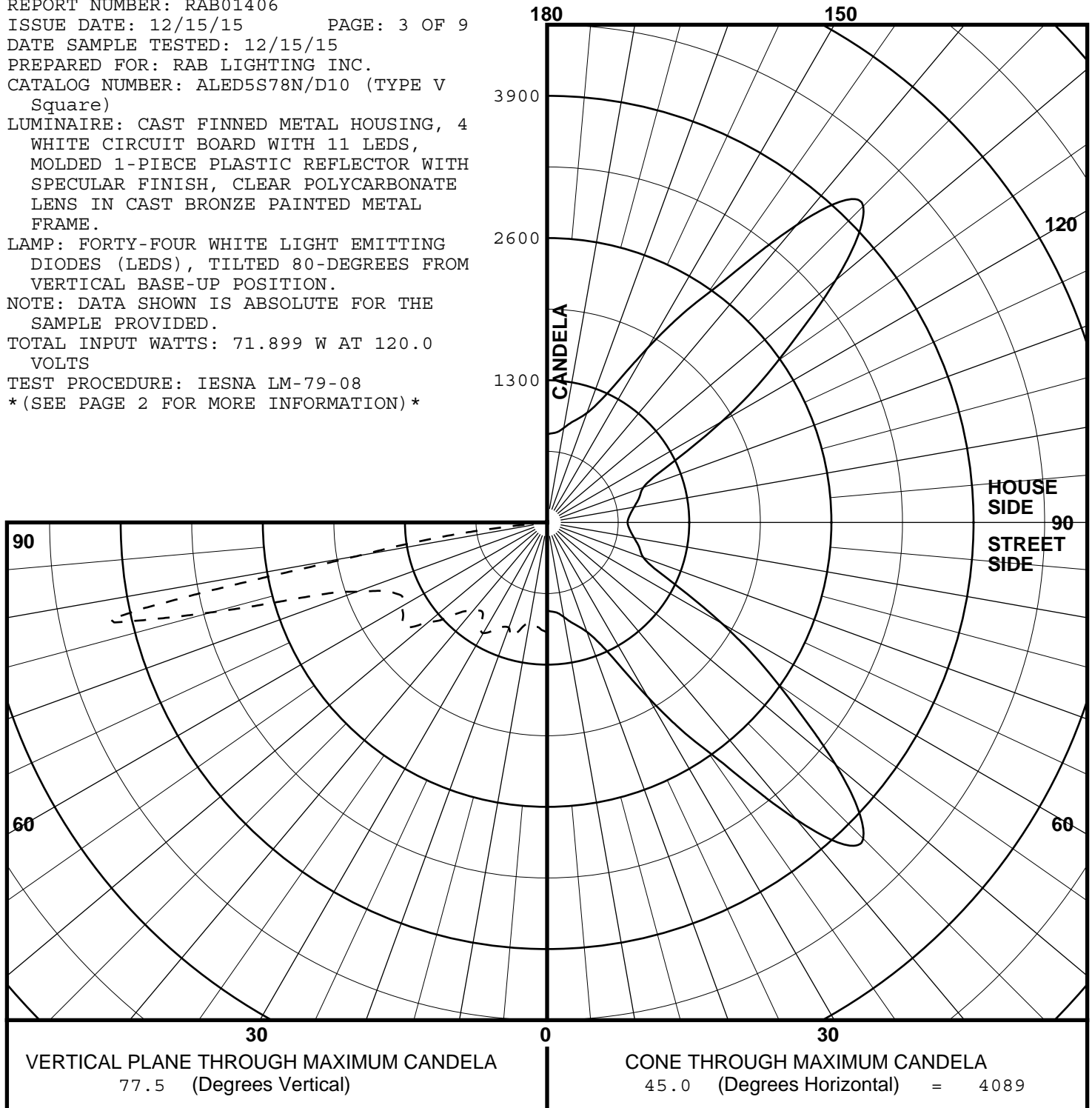
PAGE: 2 OF 9
DATE SAMPLE TESTED: 12/15/15

ADDITIONAL INFORMATION

TEST DISTANCE: 28.25 FEET
LED DRIVER: RDD-U85-A2100
ACCREDITED LABORATORY CODE 201085-0

MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

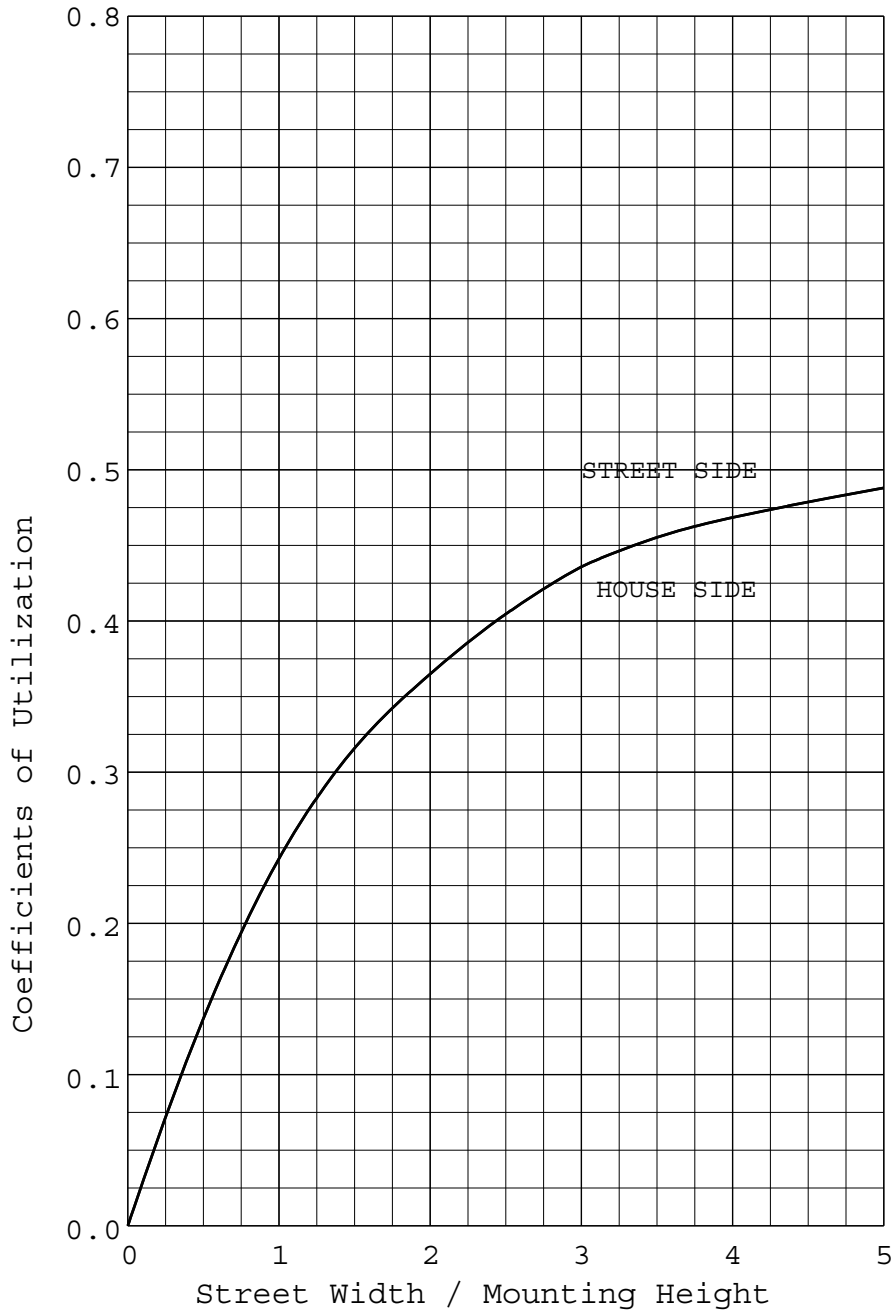
REPORT NUMBER: RAB01406
 ISSUE DATE: 12/15/15 PAGE: 3 OF 9
 DATE SAMPLE TESTED: 12/15/15
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: ALED5S78N/D10 (TYPE V Square)
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 LAMP: FORTY-FOUR WHITE LIGHT EMITTING DIODES (LEDs), TILTED 80-DEGREES FROM VERTICAL BASE-UP POSITION.
 NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.
 TOTAL INPUT WATTS: 71.899 W AT 120.0 VOLTS
 TEST PROCEDURE: IESNA LM-79-08
 (SEE PAGE 2 FOR MORE INFORMATION)



REPORT NUMBER: RAB01406
ISSUE DATE: 12/15/15
PREPARED FOR: RAB LIGHTING INC.

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

COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	4091.	50.0
DOWNWARD HOUSE SIDE	4091.	50.0
DOWNWARD TOTAL	8183.	100.0
UPWARD STREET SIDE	0.	0.0
UPWARD HOUSE SIDE	0.	0.0
UPWARD TOTAL	0.	0.0
TOTAL FLUX	8183.	100.0
TOTAL INPUT WATTS = 71.9		
EFFICACY = 113.8 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: RAB01406
 ISSUE DATE: 12/15/15
 PREPARED FOR: RAB LIGHTING INC.

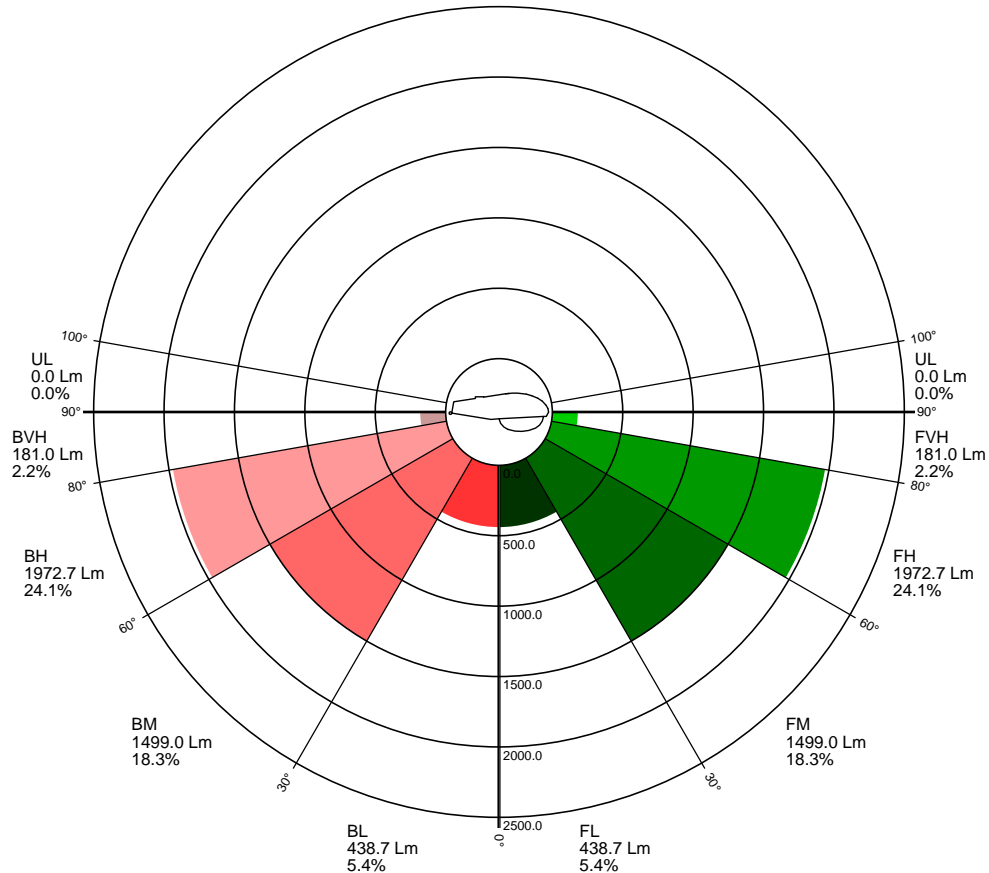
PAGE: 5 OF 9
 DATE SAMPLE TESTED: 12/15/15

BUG Rating:				B3	U0	G2
Zonal Summary		Lumens	% of Fixture	Zone Ratings		
				B	U	G
Forward		4091	50.0			
FL	(0° – 30°)	438.7	5.4			
FM	(30° – 60°)	1499.0	18.3			
FH	(60° – 80°)	1972.7	24.1			G2
FVH	(80° – 90°)	181.0	2.2			G2
Backward		4091	50.0			
BL	(0° – 30°)	438.7	5.4	B1		
BM	(30° – 60°)	1499.0	18.3	B2		
BH	(60° – 80°)	1972.7	24.1	B3		G2
BVH	(80° – 90°)	181.0	2.2			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		8183	100.0			

Zonal Lumen Summary

(Linear scale)

UH
0.0 Lm
0.0%

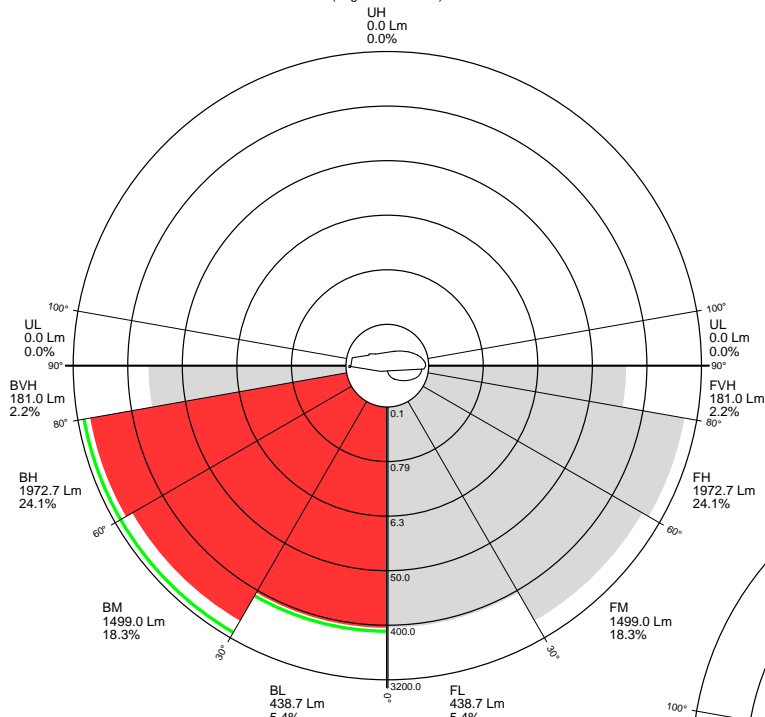


REPORT NUMBER: RAB01406
 ISSUE DATE: 12/15/15
 PREPARED FOR: RAB LIGHTING INC.

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

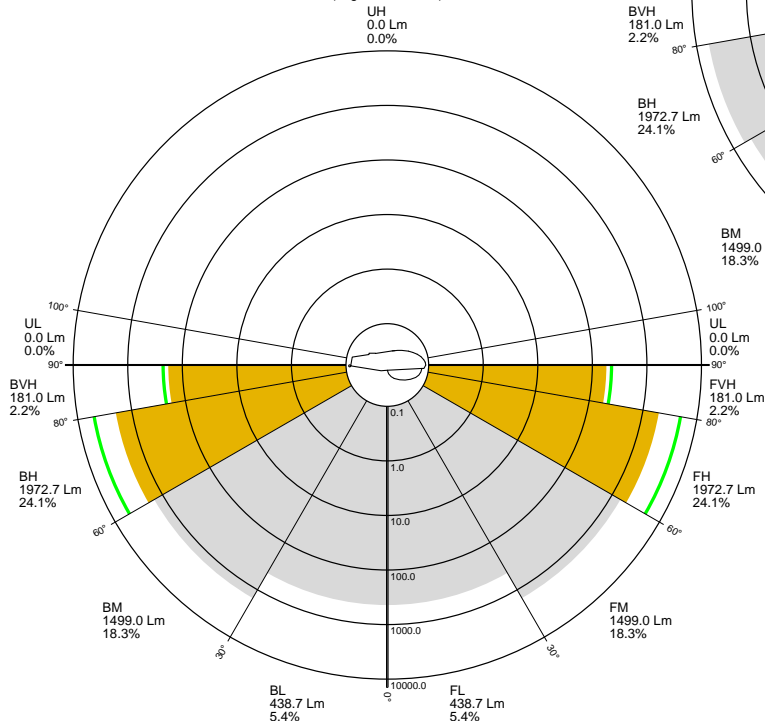
Backlight Rating Details

(Logarithmic scale)



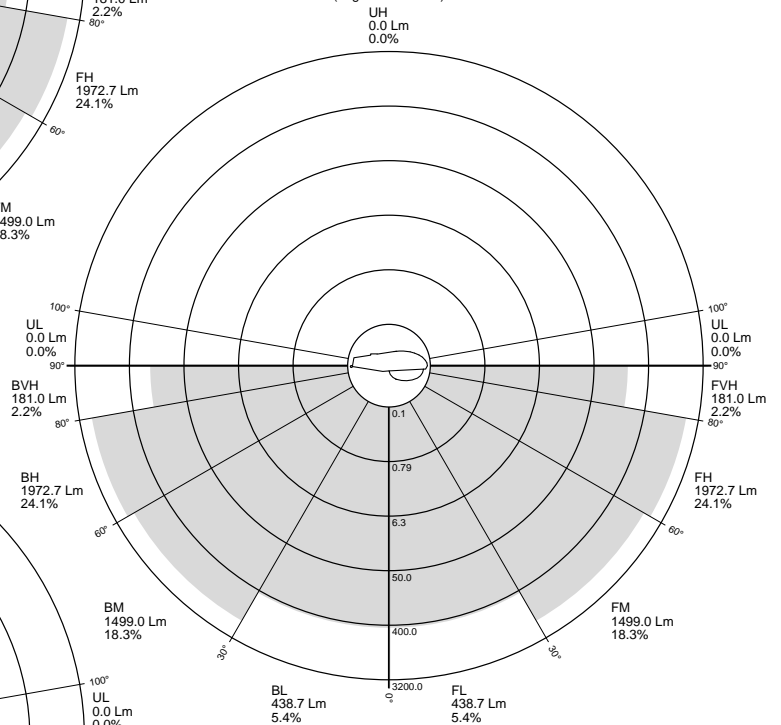
Glare Rating Details

(Logarithmic scale)



Uplight Rating Details

(Logarithmic scale)



REPORT NUMBER: RAB01406
 ISSUE DATE: 12/15/15
 PREPARED FOR: RAB LIGHTING INC.

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

CANDELA TABULATION

	STREET SIDE	LATERAL ANGLE								
		0.0	5.0	15.0	25.0	35.0	45.0	55.0	65.0	75.0 85.0
	180.0	0.	0.	0.	0.	0.	0.	0.	0.	0.
	175.0	0.	0.	0.	0.	0.	0.	0.	0.	0.
	165.0	0.	0.	0.	0.	0.	0.	0.	0.	0.
	155.0	0.	0.	0.	0.	0.	0.	0.	0.	0.
	145.0	0.	0.	0.	0.	0.	0.	0.	0.	0.
	135.0	0.	0.	0.	0.	0.	0.	0.	0.	0.
	125.0	0.	0.	0.	0.	0.	0.	0.	0.	0.
	115.0	0.	0.	0.	0.	0.	0.	0.	0.	0.
	105.0	0.	0.	0.	0.	0.	0.	0.	0.	0.
	95.0	0.	0.	0.	0.	0.	0.	0.	0.	0.
	90.0	0.	0.	0.	0.	0.	0.	0.	0.	0.
	87.5	5.	5.	5.	7.	12.	12.	11.	7.	5. 5.
	85.0	15.	20.	42.	148.	246.	73.	242.	147.	56. 24.
V	82.5	74.	93.	270.	931.	989.	881.	1054.	792.	364. 158.
E	80.0	654.	675.	802.	1054.	2156.	1741.	1892.	1074.	788. 679.
R	77.5<<	806.	823.	963.	1300.	2547.	4089.	2581.	1214.	872. 759.
T	75.0	1572.	1592.	2030.	2654.	3029.	3177.	3178.	2762.	2138. 1661.
I	72.5	2604.	2632.	2735.	2681.	2410.	2209.	2467.	2844.	2873. 2753.
C	70.0	2353.	2358.	2303.	2188.	1925.	1852.	1938.	2262.	2445. 2537.
A	67.5	1930.	1957.	1919.	1896.	1702.	1636.	1696.	1892.	1957. 2012.
L	65.0	1636.	1664.	1634.	1727.	1601.	1532.	1593.	1708.	1625. 1685.
	62.5	1492.	1520.	1527.	1605.	1592.	1488.	1586.	1605.	1504. 1497.
A	60.0	1387.	1414.	1453.	1531.	1564.	1534.	1569.	1539.	1465. 1412.
N	57.5	1379.	1390.	1426.	1424.	1552.	1561.	1575.	1444.	1462. 1410.
G	55.0	1334.	1320.	1405.	1423.	1486.	1614.	1524.	1437.	1406. 1332.
L	52.5	1330.	1323.	1403.	1418.	1475.	1572.	1469.	1422.	1406. 1338.
E	50.0	1336.	1338.	1420.	1404.	1406.	1420.	1403.	1422.	1424. 1339.
	47.5	1354.	1347.	1441.	1454.	1338.	1322.	1341.	1449.	1442. 1357.
	45.0	1376.	1370.	1437.	1425.	1232.	1185.	1199.	1436.	1418. 1348.
	42.5	1316.	1306.	1345.	1275.	1137.	1100.	1148.	1257.	1347. 1299.
	40.0	1234.	1199.	1214.	1152.	1078.	1056.	1085.	1157.	1214. 1162.
	37.5	1148.	1126.	1119.	1076.	1107.	1016.	1116.	1070.	1175. 1125.
	35.0	1093.	1068.	1039.	1073.	1081.	1022.	1110.	1055.	1072. 1074.
	30.0	1058.	1037.	1001.	1013.	1089.	1168.	1059.	1034.	1031. 1034.
	25.0	1083.	1078.	1088.	1101.	1082.	1066.	1073.	1131.	1062. 1056.
	20.0	1091.	1082.	1062.	1007.	1046.	1022.	1086.	1043.	1051. 1075.
	15.0	1028.	1026.	1008.	1012.	1033.	1038.	1026.	997.	997. 1015.
	10.0	1018.	1020.	1000.	987.	977.	949.	940.	967.	992. 1004.
	5.0	979.	982.	997.	973.	965.	960.	961.	963.	988. 985.
	0.0	1003.	1003.	1003.	1003.	1003.	1003.	1003.	1003.	1003. 1003.

||

PLANE OF MAXIMUM CANDELA

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB01406
 ISSUE DATE: 12/15/15
 PREPARED FOR: RAB LIGHTING INC.

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

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	5.	5.	5.	7.	11.	12.	12.	7.	5.	5.	5.
85.0	17.	24.	56.	147.	242.	73.	246.	148.	42.	20.	15.
V 82.5	90.	158.	364.	792.	1054.	881.	989.	931.	270.	93.	74.
E 80.0	652.	679.	788.	1074.	1892.	1741.	2156.	1054.	802.	675.	654.
R 77.5<<	736.	759.	872.	1214.	2581.	4089.	2547.	1300.	963.	823.	806.
T 75.0	1628.	1661.	2138.	2762.	3178.	3177.	3029.	2654.	2030.	1592.	1572.
I 72.5	2728.	2753.	2873.	2844.	2467.	2209.	2410.	2681.	2735.	2632.	2604.
C 70.0	2514.	2537.	2445.	2262.	1938.	1852.	1925.	2188.	2303.	2358.	2353.
A 67.5	2011.	2012.	1957.	1892.	1696.	1636.	1702.	1896.	1919.	1957.	1930.
L 65.0	1662.	1685.	1625.	1708.	1593.	1532.	1601.	1727.	1634.	1664.	1636.
62.5	1470.	1497.	1504.	1605.	1586.	1488.	1592.	1605.	1527.	1520.	1492.
A 60.0	1381.	1412.	1465.	1539.	1569.	1534.	1564.	1531.	1453.	1414.	1387.
N 57.5	1424.	1410.	1462.	1444.	1575.	1561.	1552.	1424.	1426.	1390.	1379.
G 55.0	1337.	1332.	1406.	1437.	1524.	1614.	1486.	1423.	1405.	1320.	1334.
L 52.5	1354.	1338.	1406.	1422.	1469.	1572.	1475.	1418.	1403.	1323.	1330.
E 50.0	1363.	1339.	1424.	1422.	1403.	1420.	1406.	1404.	1420.	1338.	1336.
47.5	1364.	1357.	1442.	1449.	1341.	1322.	1338.	1454.	1441.	1347.	1354.
45.0	1349.	1348.	1418.	1436.	1199.	1185.	1232.	1425.	1437.	1370.	1376.
42.5	1324.	1299.	1347.	1257.	1148.	1100.	1137.	1275.	1345.	1306.	1316.
40.0	1194.	1162.	1214.	1157.	1085.	1056.	1078.	1152.	1214.	1199.	1234.
37.5	1145.	1125.	1175.	1070.	1116.	1016.	1107.	1076.	1119.	1126.	1148.
35.0	1095.	1074.	1072.	1055.	1110.	1022.	1081.	1073.	1039.	1068.	1093.
30.0	1046.	1034.	1031.	1034.	1059.	1168.	1089.	1013.	1001.	1037.	1058.
25.0	1064.	1056.	1062.	1131.	1073.	1066.	1082.	1101.	1088.	1078.	1083.
20.0	1081.	1075.	1051.	1043.	1086.	1022.	1046.	1007.	1062.	1082.	1091.
15.0	1021.	1015.	997.	997.	1026.	1038.	1033.	1012.	1008.	1026.	1028.
10.0	1000.	1004.	992.	967.	940.	949.	977.	987.	1000.	1020.	1018.
5.0	979.	985.	988.	963.	961.	960.	965.	973.	997.	982.	979.
0.0	1003.	1003.	1003.	1003.	1003.	1003.	1003.	1003.	1003.	1003.	1003.

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB01406
 ISSUE DATE: 12/15/15
 PREPARED FOR: RAB LIGHTING INC.

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

5-DEGREE ZONAL LUMEN SUMMARY

0- 5	24
5- 10	70
10- 15	120
15- 20	170
20- 25	224
25- 30	270
30- 35	312
35- 40	369
40- 45	462
45- 50	557
50- 55	619
55- 60	680
60- 65	757
65- 70	955
70- 75	1295
75- 80	937
80- 85	345
85- 90	17
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	93
0- 20	383
0- 30	877
0- 40	1559
0- 50	2577
0- 60	3876
0- 70	5588
0- 80	7821
0- 90	8183
0-100	8183
0-110	8183
0-120	8183
0-130	8183
0-140	8183
0-150	8183
0-160	8183
0-170	8183
0-180	8183

REPORT NUMBER: RAB01407
DATE: 12/14/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: ALED5S78N/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-U85-A2100

OBJECT OF TEST: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT THE RATED INPUT VOLTAGES (120.0 AND 277.0 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 (277.0 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: RAB01407
 DATE: 12/14/2015
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: ALED5S78N/D10 (TYPE V Square)

Page 2 of 4

RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	8183 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3893
Chromaticity Ordinate y	0.3942
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2240
Chromaticity Ordinate v'	0.5103
Correlated Color Temp CCT (K)	3896
ANSI C78.377-2008 Duv	0.005
Total Radiant Flux (milliWatts)	23557 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.602
Input Power (Watts)	71.9
Input Power Factor (%)	99.5
Input Current THD (%)	7.8
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	113.8
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.277
Input Power (Watts)	70.9
Input Power Factor (%)	92.4
Input Current THD (%)	14.5
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	73
R1 Light greyish red	70
R2 Dark greyish yellow	77
R3 Strong yellowish green	84
R4 Moderate yellowish green	74
R5 Light bluish green	70
R6 Light blue	69
R7 Light violet	81
R8 Light reddish purple	55
R9 Strong red	-24
R10 Strong yellow	47
R11 Strong green	72
R12 Strong blue	47
R13 Light yellowish pink (skin)	70
R14 Moderate olive green (leaf)	91

*NOTE:

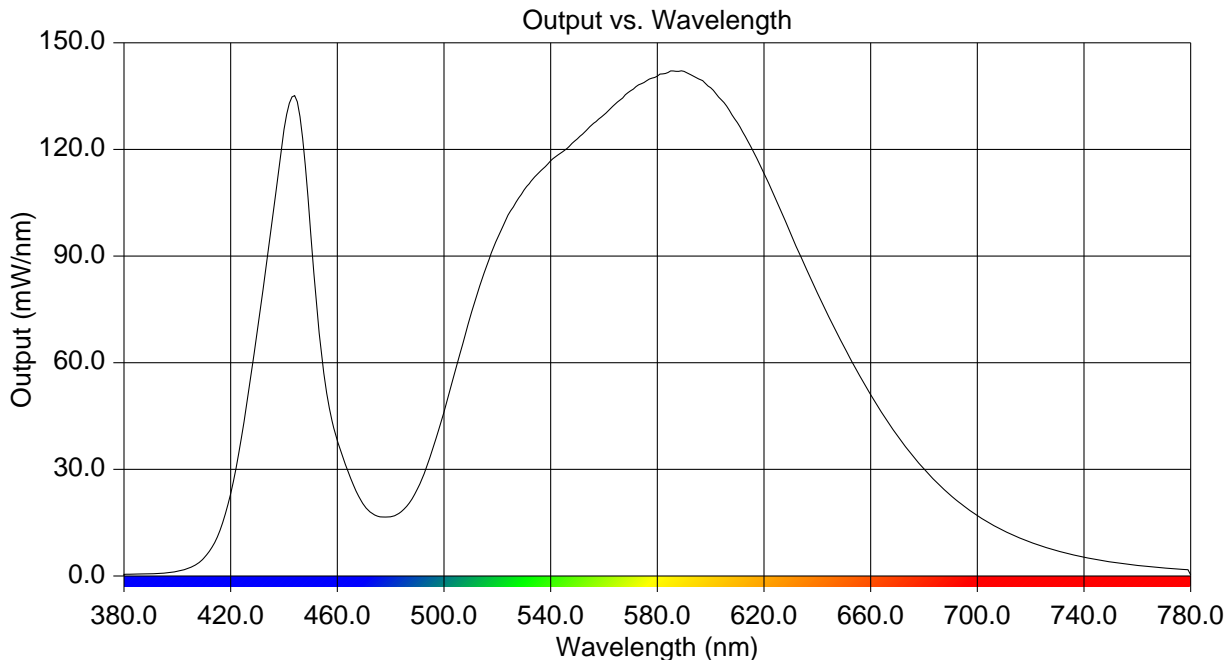
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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.

REPORT NUMBER: RAB01407
 DATE: 12/14/2015
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: ALED5S78N/D10 (TYPE V Square)

Page 3 of 4

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.455	515	85.133	650	64.445
385	0.526	520	95.003	655	57.446
390	0.623	525	102.734	660	51.043
395	0.819	530	108.543	665	44.975
400	1.320	535	113.005	670	39.546
405	2.423	540	116.791	675	34.491
410	5.084	545	119.564	680	30.101
415	10.959	550	122.942	685	26.175
420	23.131	555	126.667	690	22.657
425	43.304	560	129.685	695	19.659
430	68.941	565	133.264	700	16.959
435	96.221	570	136.479	705	14.667
440	125.579	575	138.790	710	12.694
445	133.359	580	140.580	715	10.970
450	96.549	585	142.053	720	9.499
455	56.663	590	141.930	725	8.201
460	38.089	595	139.913	730	7.077
465	27.470	600	137.324	735	6.107
470	19.897	605	133.153	740	5.269
475	16.842	610	127.530	745	4.569
480	16.656	615	120.846	750	3.977
485	18.800	620	113.224	755	3.429
490	24.438	625	105.001	760	2.975
495	34.002	630	96.414	765	2.590
500	46.181	635	87.830	770	2.265
505	59.845	640	79.709	775	1.968
510	73.336	645	71.794	780	0.298



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CIE Chromaticity Diagram

