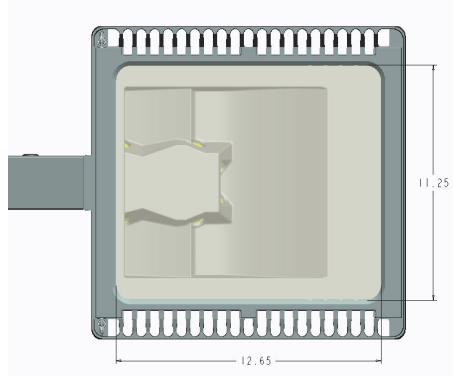
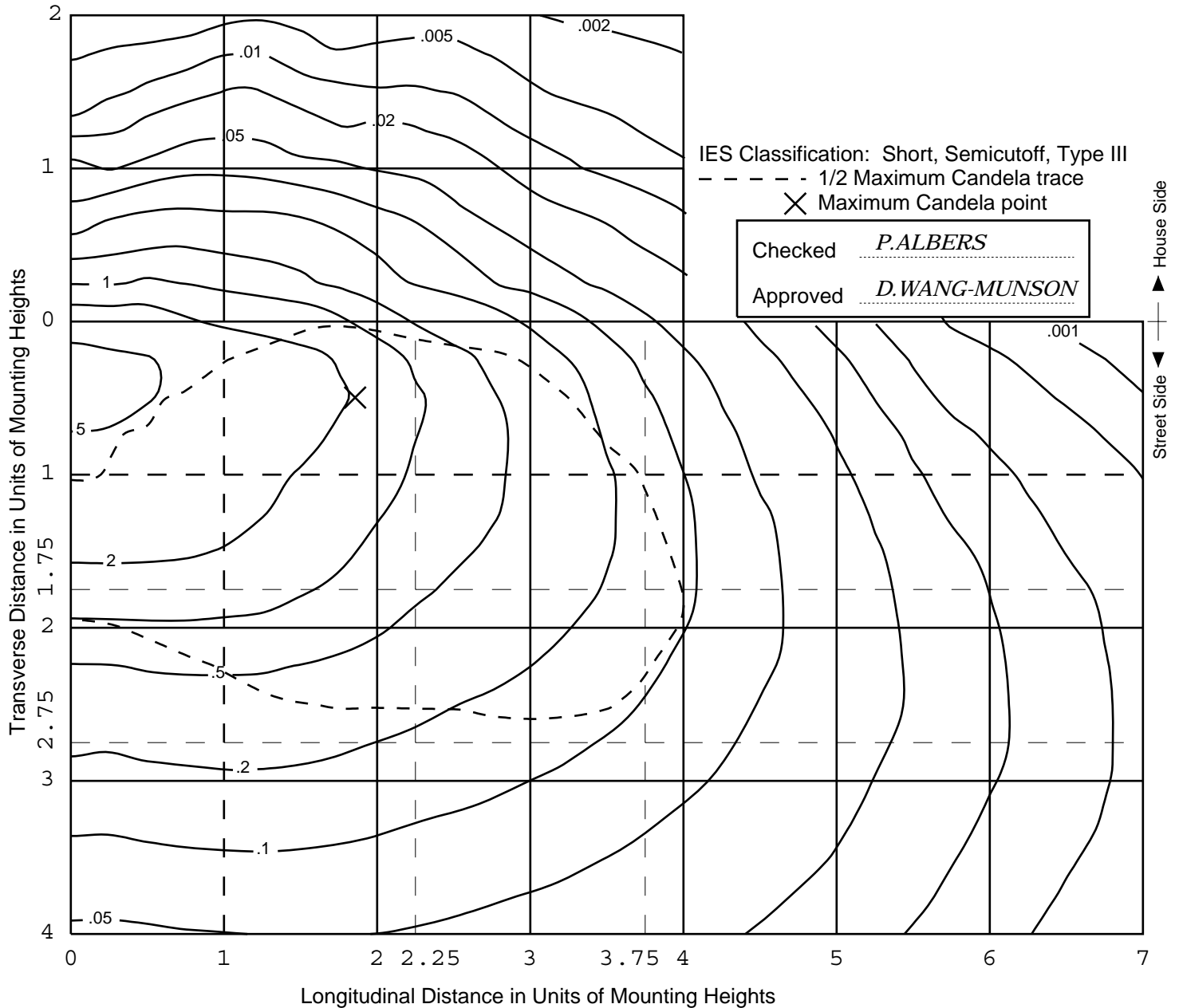


ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

Values based on 25 foot mounting height.



REPORT NUMBER: RAB04223
 ISSUE DATE: 04/18/18 PAGE: 1 OF 9
 DATE SAMPLE TESTED: 04/18/18
 PREPARED FOR: RAB LIGHTING INC. RC
 LIGHTING
 CATALOG NUMBER: ALED3T150 - RWLED3T150
 - RWLED3T150SF - WPLED3T150 (TYPE
 III) (ALSO APPLIES TO RCL)
 LUMINAIRE: CAST FINNED METAL HOUSING, 6
 CIRCUIT BOARDS EACH WITH 1 LED,
 MOLDED PLASTIC REFLECTOR WITH
 SPECULAR FINISH AND 1 APERTURE PER
 LED, CLEAR FLAT GLASS LENS IN CAST
 BLACK PAINTED METAL LENS FRAME.
 (SEE PAGE 2 FOR MORE INFORMATION)



REPORT NUMBER: RAB04223

PAGE: 2 OF 9

ISSUE DATE: 04/18/18

DATE SAMPLE TESTED: 04/18/18

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

ADDITIONAL INFORMATION

LAMPS: SIX WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDs), 2 LEDs TILTED 63-DEGREES FROM VERTICAL BASE-UP POSITION AND CANTED 75-DEGREES FROM STRAIGHT AHEAD, 2 LEDs TILTED 67-DEGREES FROM VERTICAL BASE-UP POSITION AND CANTED 68-DEGREES FROM STRAIGHT AHEAD, 2 LEDs TILTED 58-DEGREES FROM VERTICAL BASE-UP POSITION AND CANTED 40-DEGREES FROM STRAIGHT AHEAD.

NOTE: THIS REPORT WITH THE USE OF THE NVLAP LOGO SHALL NOT BE USED BY THE CLIENT TO CLAIM PRODUCT CERTIFICATION, APPROVAL, OR ENDORSEMENT BY NVLAP, NIST, OR ANY AGENCY OF THE FEDERAL GOVERNMENT.

NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.

TOTAL INPUT WATTS = 161.85 W AT 120.0 VAC.

LED DRIVER: RDD-160 (2.1A)

TEST PROCEDURE: IESNA LM-79-08

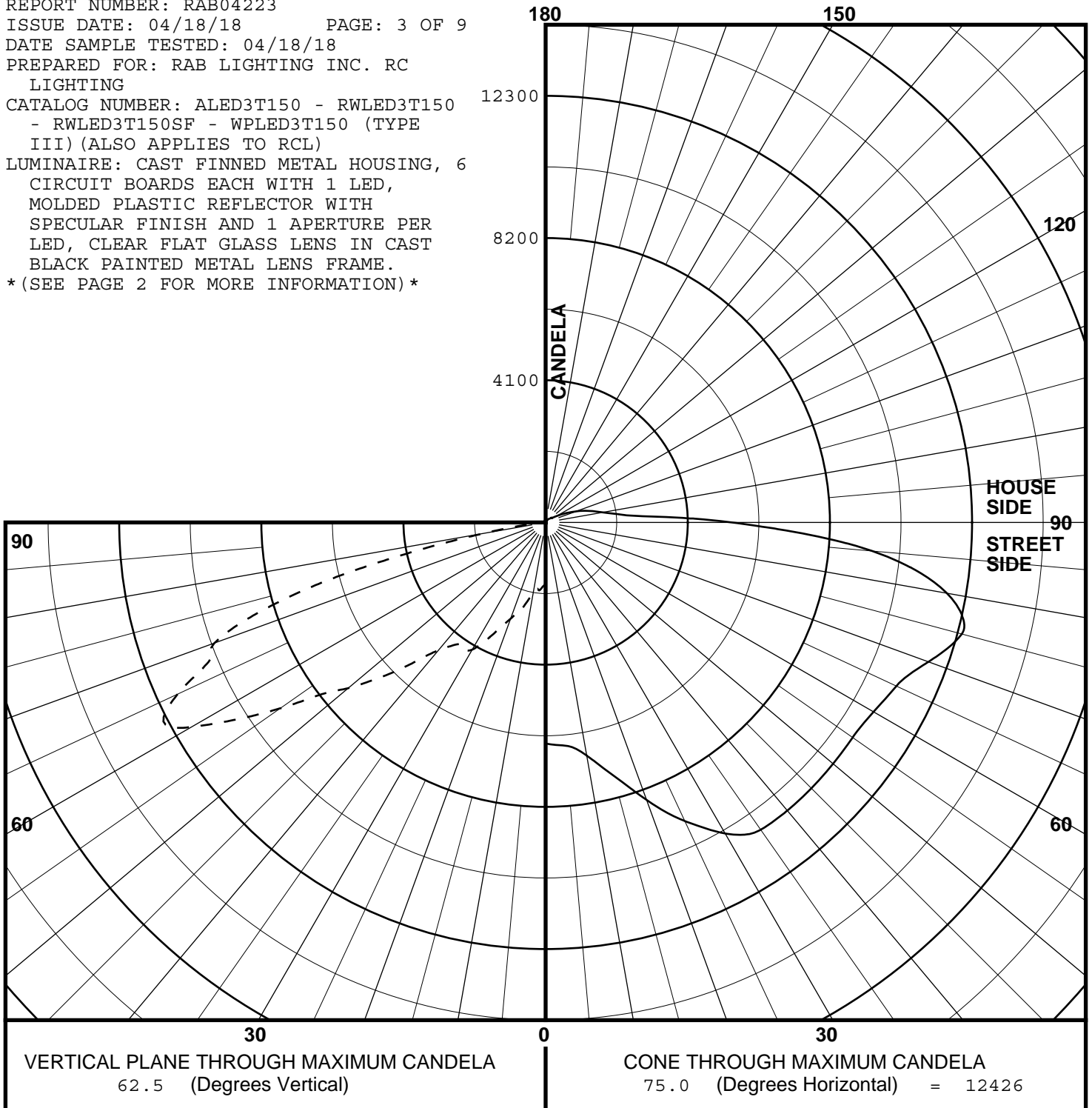
LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE

AMBIENT: 25.1

ACCREDITED LABORATORY CODE 201058-0

MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

REPORT NUMBER: RAB04223
 ISSUE DATE: 04/18/18 PAGE: 3 OF 9
 DATE SAMPLE TESTED: 04/18/18
 PREPARED FOR: RAB LIGHTING INC. RC
 LIGHTING
 CATALOG NUMBER: ALED3T150 - RWLED3T150
 - RWLED3T150SF - WPLED3T150 (TYPE
 III) (ALSO APPLIES TO RCL)
 LUMINAIRE: CAST FINNED METAL HOUSING, 6
 CIRCUIT BOARDS EACH WITH 1 LED,
 MOLDED PLASTIC REFLECTOR WITH
 SPECULAR FINISH AND 1 APERTURE PER
 LED, CLEAR FLAT GLASS LENS IN CAST
 BLACK PAINTED METAL LENS FRAME.
 (SEE PAGE 2 FOR MORE INFORMATION)



REPORT NUMBER: RAB04223

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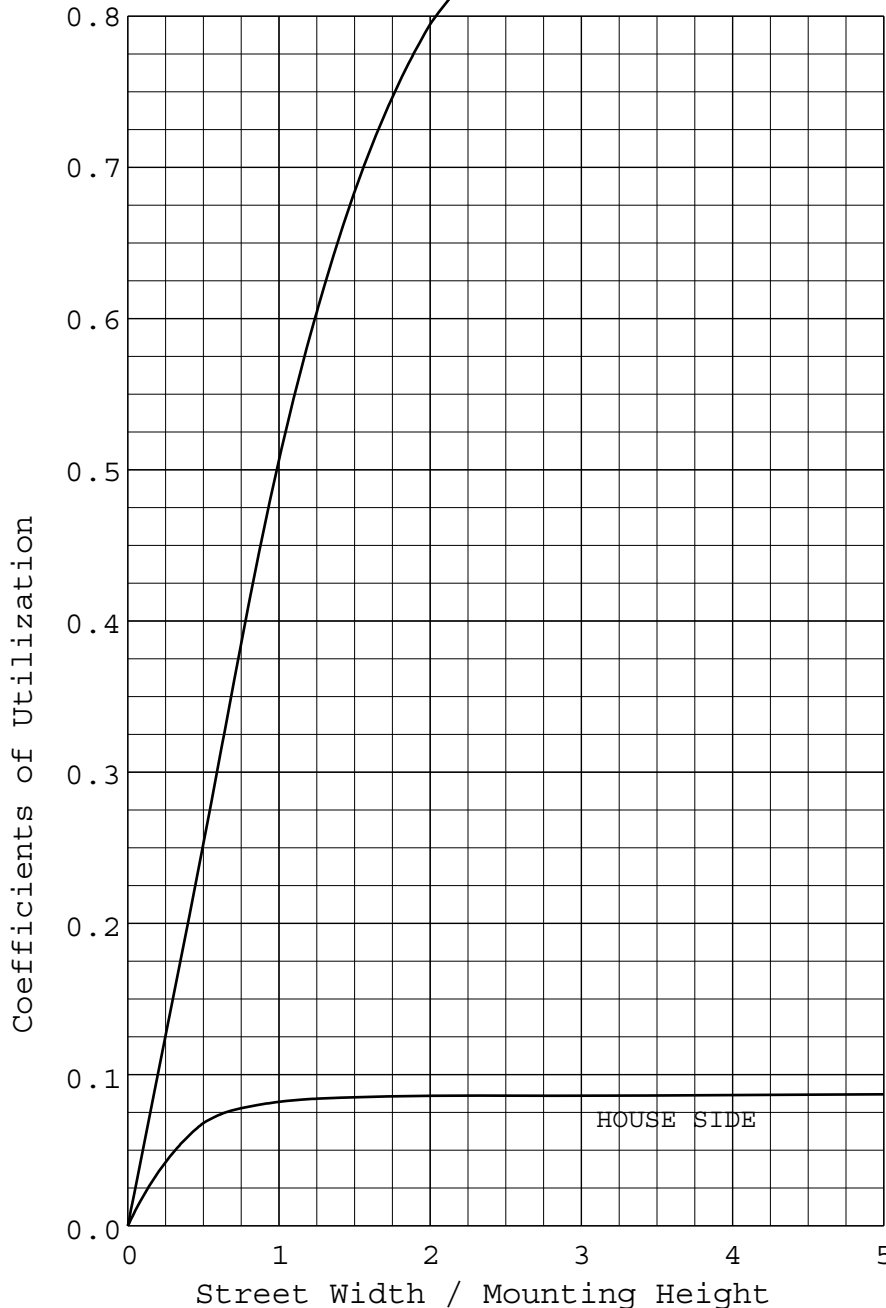
ISSUE DATE: 04/18/18

STREET SIDE

DATE SAMPLE TESTED: 04/18/18

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	17038.	91.3
DOWNWARD HOUSE SIDE	1630.	8.7
DOWNWARD TOTAL	18668.	100.0
UPWARD STREET SIDE	0.	0.0
UPWARD HOUSE SIDE	0.	0.0
UPWARD TOTAL	0.	0.0
TOTAL FLUX	18668.	100.0
TOTAL INPUT WATTS = 161.9		
EFFICACY = 115.3 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: RAB04223

ISSUE DATE: 04/18/18

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

PAGE: 5 OF 9

DATE SAMPLE TESTED: 04/18/18

BUG Rating:

Zonal Summary

Lumens

% of Fixture

B1 U0 G3

Zone Ratings

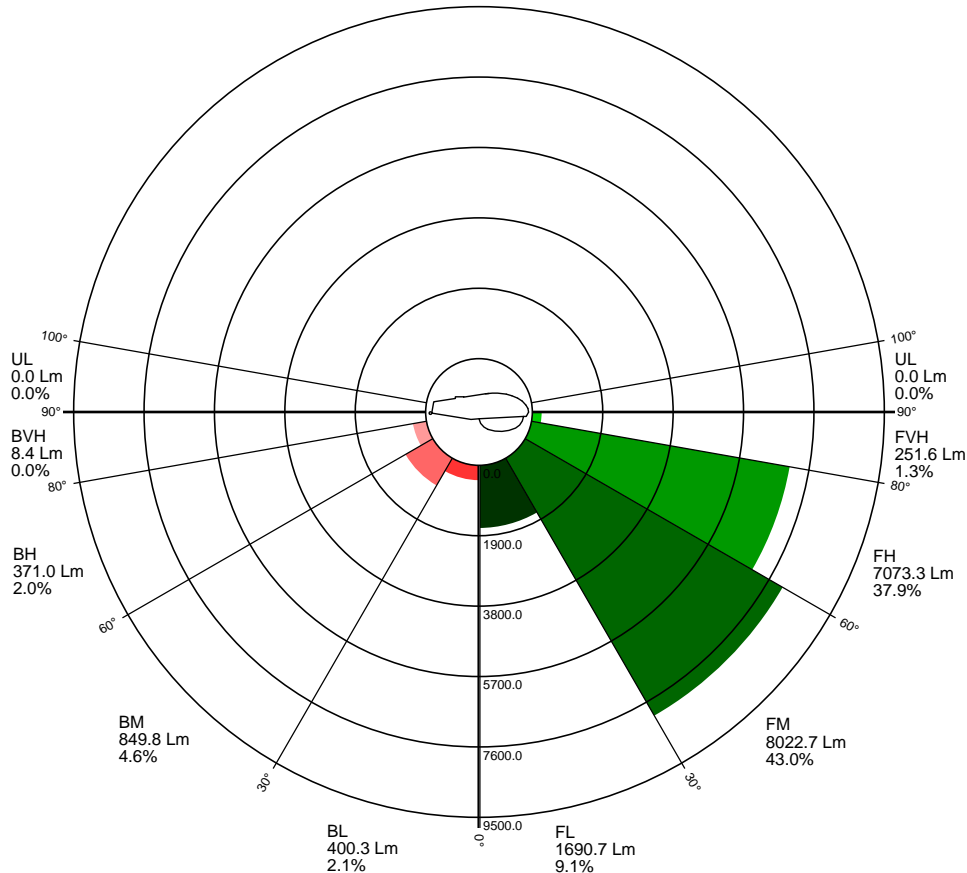
B U G

Forward		17038	91.3			
FL	(0° - 30°)	1690.7	9.1			
FM	(30° - 60°)	8022.7	43.0			
FH	(60° - 80°)	7073.3	37.9			G3
FVH	(80° - 90°)	251.6	1.3			G3
Backward		1630	8.7			
BL	(0° - 30°)	400.3	2.1	B1		
BM	(30° - 60°)	849.8	4.6	B1		
BH	(60° - 80°)	371.0	2.0	B1		G1
BVH	(80° - 90°)	8.4	0.0			G0
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		18668	100.0			

Zonal Lumen Summary

(Linear scale)

UH
0.0 Lm
0.0%



REPORT NUMBER: RAB04223

ISSUE DATE: 04/18/18

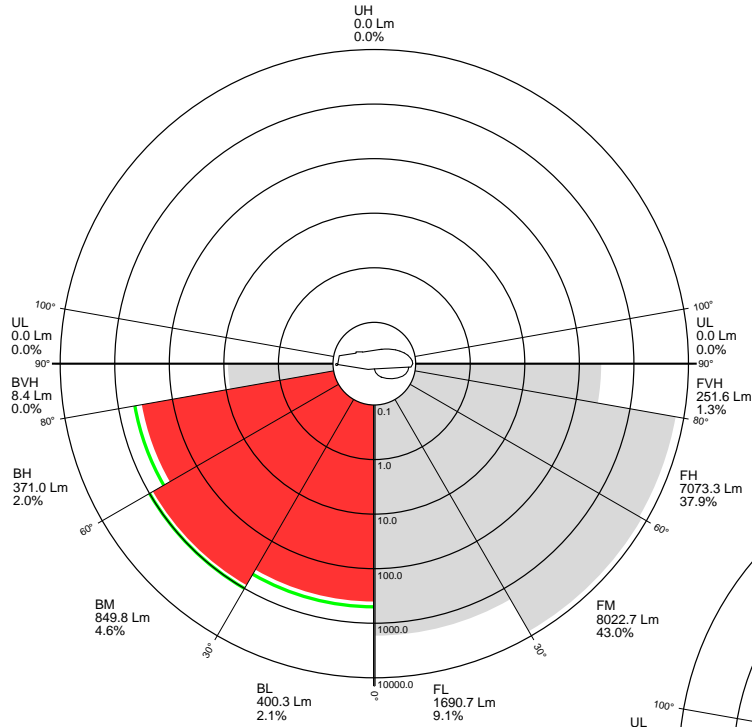
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

PAGE: 6 OF 9

DATE SAMPLE TESTED: 04/18/18

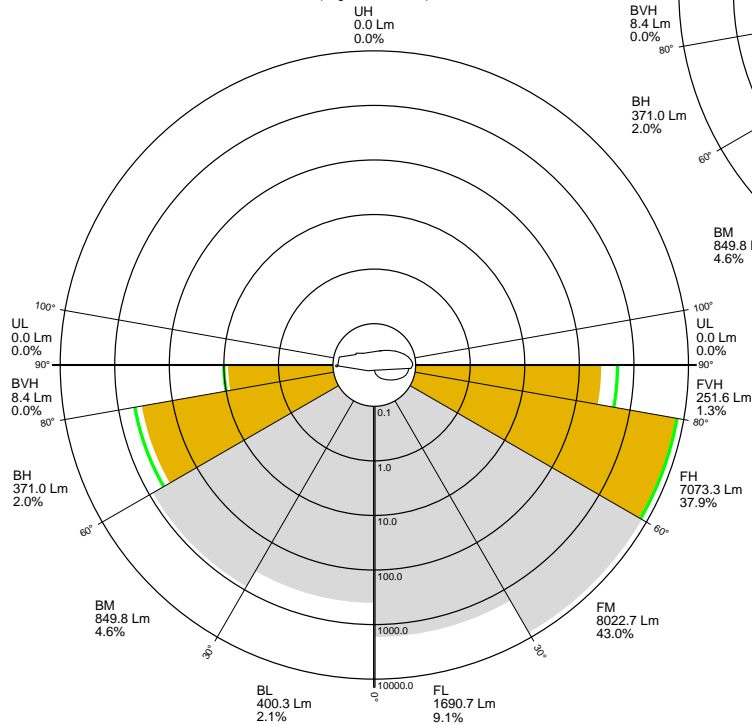
Backlight Rating Details

(Logarithmic scale)



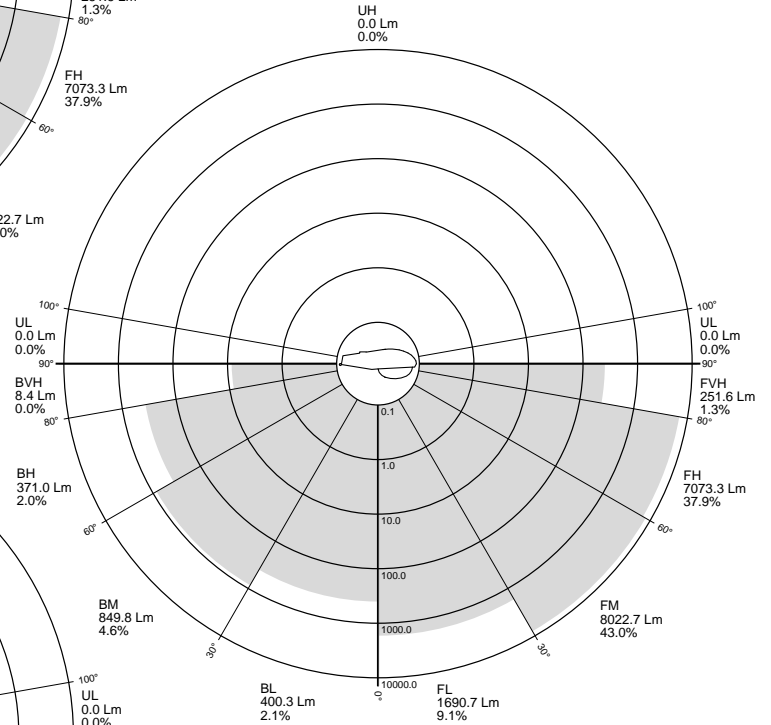
Glare Rating Details

(Logarithmic scale)



Uplight Rating Details

(Logarithmic scale)



REPORT NUMBER: RAB04223

PAGE: 7 OF 9

ISSUE DATE: 04/18/18

DATE SAMPLE TESTED: 04/18/18

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

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.	0.
	175.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	165.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	155.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	145.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	135.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	125.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	115.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	105.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	95.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	90.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	87.5	10.	9.	16.	14.	29.	31.	28.	20.	17.	15.
	85.0	70.	61.	122.	159.	246.	198.	241.	290.	165.	52.
V	82.5	212.	224.	471.	585.	932.	1009.	1162.	1228.	743.	169.
E	80.0	468.	523.	947.	1470.	2158.	2970.	3512.	3239.	1824.	549.
R	77.5	1310.	1356.	1954.	2826.	3632.	4816.	5938.	6026.	3970.	1718.
T	75.0	2285.	2278.	2953.	3814.	4707.	5942.	7709.	8660.	6649.	3522.
I	72.5	2876.	2890.	3675.	4783.	5946.	7066.	9116.	10483.	8747.	5619.
C	70.0	3513.	3410.	4285.	5669.	7352.	9622.	10093.	11073.	10167.	6837.
A	67.5	4073.	3977.	5030.	6698.	9277.	11008.	10920.	10847.	10526.	7347.
L	65.0	4792.	4859.	6291.	7988.	10503.	11031.	11104.	11474.	11710.	8235.
	62.5<<	6378.	6459.	7554.	9497.	10817.	10839.	10810.	11162.	12426.	9460.
A	60.0	8048.	8038.	9048.	10028.	10768.	10706.	10098.	11056.	11799.	8801.
N	57.5	8469.	8453.	8783.	9242.	9830.	9632.	9497.	11206.	10573.	7985.
G	55.0	7573.	7671.	8042.	8542.	8550.	8849.	9293.	10174.	9347.	6823.
L	52.5	7123.	7241.	7421.	7560.	7544.	8434.	9222.	9647.	8130.	5814.
E	50.0	6816.	6933.	6925.	6752.	7165.	8178.	8531.	8886.	7429.	5206.
	47.5	6430.	6479.	6404.	6377.	6945.	7720.	7613.	7699.	6714.	4663.
	45.0	6087.	6122.	6167.	6403.	6618.	7116.	7158.	6817.	6019.	4095.
	42.5	6118.	6159.	6235.	6477.	6385.	6672.	6688.	6120.	5325.	3751.
	40.0	5861.	5890.	6064.	6643.	5959.	6454.	6182.	5657.	4814.	3396.
	37.5	5778.	5756.	5984.	6322.	6110.	6283.	5739.	5507.	4491.	3169.
	35.0	5874.	5921.	5775.	6069.	5963.	5871.	5622.	5406.	4284.	3077.
	30.0	6104.	6072.	5587.	5581.	5349.	5173.	5174.	5051.	4234.	2944.
	25.0	5743.	5732.	5141.	4891.	4823.	4872.	4714.	4281.	3535.	2604.
	20.0	5333.	5344.	5032.	4653.	4543.	4463.	4065.	3626.	2952.	2271.
	15.0	4753.	4783.	4668.	4363.	3982.	3694.	3426.	3073.	2535.	2070.
	10.0	3871.	3911.	3856.	3696.	3412.	3045.	2696.	2398.	2079.	1836.
	5.0	2765.	2787.	2713.	2648.	2509.	2433.	2269.	2113.	1962.	1846.
	0.0	1765.	1765.	1765.	1765.	1765.	1765.	1765.	1765.	1765.	1765.

||
PLANE OF MAXIMUM CANDELA

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB04223

PAGE: 8 OF 9

ISSUE DATE: 04/18/18

DATE SAMPLE TESTED: 04/18/18

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

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.
	175.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	165.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	155.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	145.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	135.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	125.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	115.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	105.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	95.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	90.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	87.5	15.	15.	15.	15.	14.	13.	11.	8.	8.	8.
	85.0	23.	20.	19.	16.	14.	13.	11.	8.	8.	8.
V	82.5	58.	42.	25.	19.	15.	13.	11.	8.	9.	9.
E	80.0	232.	142.	71.	47.	16.	13.	11.	9.	10.	10.
R	77.5	990.	508.	165.	97.	21.	13.	11.	9.	10.	11.
T	75.0	2048.	875.	286.	122.	44.	16.	12.	11.	13.	14.
I	72.5	3188.	1260.	392.	177.	116.	40.	14.	14.	16.	17.
C	70.0	4036.	1658.	673.	311.	134.	47.	22.	14.	16.	17.
A	67.5	4154.	1883.	1050.	427.	148.	66.	47.	19.	18.	18.
L	65.0	4510.	1883.	1169.	513.	182.	97.	84.	30.	21.	22.
	62.5<<	5380.	2346.	1295.	621.	237.	165.	117.	42.	26.	22.
A	60.0	5710.	2545.	1571.	717.	293.	228.	123.	54.	35.	26.
N	57.5	5471.	2693.	1602.	890.	349.	253.	134.	64.	38.	27.
G	55.0	4858.	2603.	1534.	950.	388.	269.	152.	76.	42.	25.
L	52.5	4205.	2590.	1461.	890.	443.	294.	172.	92.	50.	27.
E	50.0	3790.	2652.	1387.	884.	508.	330.	190.	101.	62.	49.
	47.5	3434.	2621.	1384.	937.	595.	350.	210.	115.	69.	91.
	45.0	3116.	2459.	1413.	937.	632.	381.	243.	126.	98.	86.
	42.5	2894.	2315.	1431.	921.	683.	419.	267.	153.	104.	71.
	40.0	2702.	2198.	1442.	906.	726.	451.	282.	195.	136.	103.
	37.5	2629.	2196.	1484.	903.	745.	481.	310.	191.	160.	135.
	35.0	2629.	2245.	1555.	940.	743.	496.	357.	227.	162.	140.
	30.0	2504.	2200.	1611.	1054.	734.	610.	426.	296.	222.	182.
	25.0	2278.	2005.	1580.	1251.	791.	578.	444.	332.	254.	235.
	20.0	2027.	1840.	1475.	1222.	953.	666.	494.	388.	317.	291.
	15.0	1906.	1799.	1502.	1299.	1082.	925.	753.	666.	617.	618.
	10.0	1735.	1653.	1485.	1323.	1233.	1151.	1082.	1013.	948.	889.
	5.0	1789.	1735.	1623.	1539.	1439.	1375.	1304.	1246.	1200.	1190.
	0.0	1765.	1765.	1765.	1765.	1765.	1765.	1765.	1765.	1765.	1765.

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB04223

ISSUE DATE: 04/18/18

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

PAGE: 9 OF 9

DATE SAMPLE TESTED: 04/18/18

5-DEGREE ZONAL LUMEN SUMMARY

0- 5	44
5- 10	142
10- 15	263
15- 20	396
20- 25	540
25- 30	707
30- 35	883
35- 40	1040
40- 45	1237
45- 50	1510
50- 55	1873
55- 60	2330
60- 65	2507
65- 70	2233
70- 75	1736
75- 80	969
80- 85	243
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	186
0- 20	844
0- 30	2091
0- 40	4013
0- 50	6760
0- 60	10964
0- 70	15703
0- 80	18408
0- 90	18668
0-100	18668
0-110	18668
0-120	18668
0-130	18668
0-140	18668
0-150	18668
0-160	18668
0-170	18668
0-180	18668

REPORT NUMBER: RAB04248
 DATE: 4/17/2018
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
 CATALOG NUMBER: ALED3T150 - RWLED3T150 - RWLED3T150SF - WPLED3T150 (TYPE III) (ALSO APPLIES TO RCL)

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: CAST FINNED METAL HOUSING, 6 CIRCUIT BOARDS EACH WITH 1 LED, MOLDED PLASTIC REFLECTOR WITH SPECULAR FINISH AND 1 APERTURE PER LED, CLEAR FLAT GLASS LENS IN CAST BLACK PAINTED METAL LENS FRAME.

LAMP: SIX WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDs), 2 LEDs TILTED 63-DEGREES FROM VERTICAL BASE-UP POSITION AND CANTED 75-DEGREES FROM STRAIGHT AHEAD, 2 LEDs TILTED 67-DEGREES FROM VERTICAL BASE-UP POSITION AND CANTED 68-DEGREES FROM STRAIGHT AHEAD, 2 LEDs TILTED 58-DEGREES FROM VERTICAL BASE-UP POSITION AND CANTED 40-DEGREES FROM STRAIGHT AHEAD.

DRIVER: RDD-160

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:	GWINSTEK PROGRAMMABLE AC POWER SOURCE APS-7100	Calibration Due:
	CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202	N/A
	OCEAN OPTICS QE65PRO Spectroradiometer	3/08/19
	RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	02/22/19

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: RAB04248
 DATE: 4/17/2018
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
 CATALOG NUMBER: ALED3T150 - RWLED3T150 - RWLED3T150SF - WPLED3T150 (TYPE III) (ALSO APPLIES TO RCL)

Page 2 of 4

RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	18668 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3486
Chromaticity Ordinate y	0.3594
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2108
Chromaticity Ordinate v'	0.4890
Correlated Color Temp CCT (K)	4898
ANSI C78.377-2008 Duv	0.003
Total Radiant Flux (milliWatts)	55919 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	1.36
Input Power (Watts)	161.8
Input Power Factor (%)	99.4
Input Current THD (%)	7.7
Input Voltage THD (%)	0.1
EFFICACY (Lumens/Watt)	
	115.4
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.591
Input Power (Watts)	158.3
Input Power Factor (%)	96.7
Input Current THD (%)	11.6
Input Voltage THD (%)	0.2
Off-State Power (Watts)	
	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	75
R1 Light greyish red	71
R2 Dark greyish yellow	79
R3 Strong yellowish green	88
R4 Moderate yellowish green	76
R5 Light bluish green	74
R6 Light blue	74
R7 Light violet	81
R8 Light reddish purple	55
R9 Strong red	-32
R10 Strong yellow	54
R11 Strong green	75
R12 Strong blue	59
R13 Light yellowish pink (skin)	72
R14 Moderate olive green (leaf)	93

*NOTE:

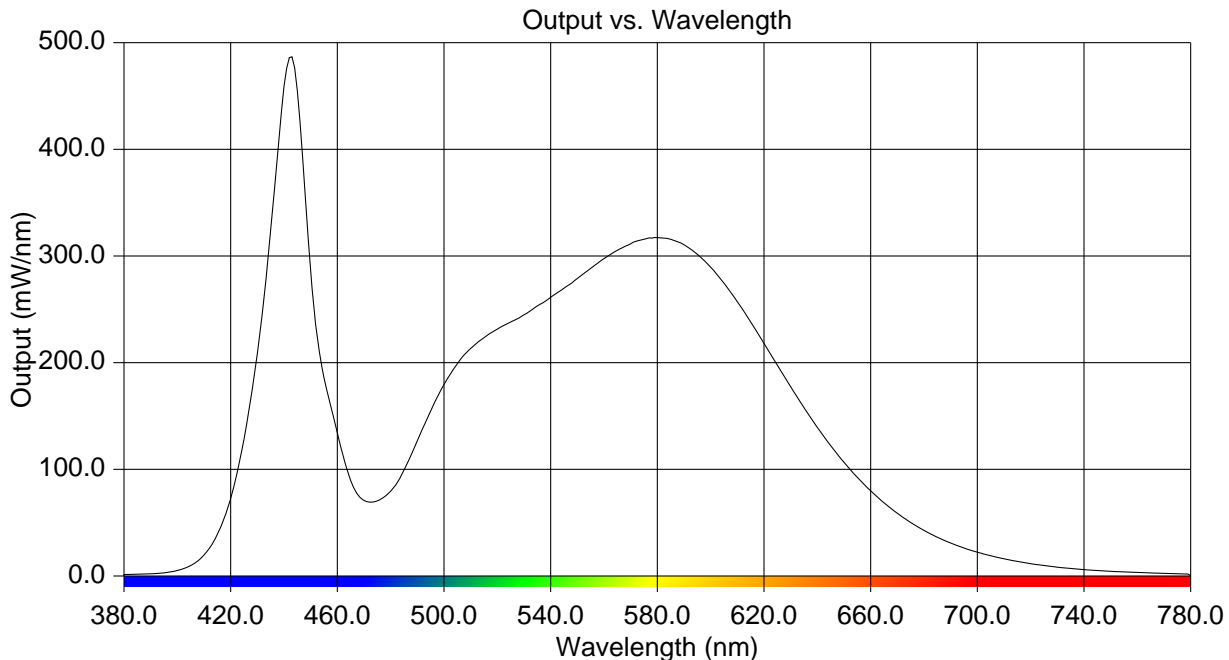
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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: RAB04248
 DATE: 4/17/2018
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
 CATALOG NUMBER: ALED3T150 - RWLED3T150 - RWLED3T150SF - WPLED3T150 (TYPE III) (ALSO APPLIES TO RCL)

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RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	1.327	515	223.452	650	106.511
385	1.626	520	231.776	655	92.399
390	2.075	525	238.129	660	79.835
395	3.045	530	244.896	665	68.525
400	5.063	535	253.221	670	58.723
405	9.698	540	261.161	675	50.277
410	19.687	545	269.861	680	42.726
415	38.782	550	278.963	685	36.443
420	72.622	555	288.754	690	30.924
425	128.130	560	297.435	695	26.231
430	208.552	565	305.265	700	22.239
435	322.856	570	311.400	705	18.908
440	459.064	575	315.582	710	16.031
445	454.829	580	317.453	715	13.610
450	285.972	585	315.761	720	11.555
455	185.801	590	310.723	725	9.760
460	134.020	595	301.479	730	8.285
465	89.518	600	289.695	735	7.041
470	70.809	605	274.552	740	5.991
475	70.634	610	257.104	745	5.136
480	79.506	615	238.138	750	4.406
485	99.344	620	218.302	755	3.780
490	126.556	625	197.931	760	3.272
495	154.853	630	177.307	765	2.796
500	179.550	635	157.774	770	2.422
505	198.934	640	139.158	775	2.086
510	213.546	645	122.185	780	0.311



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CIE Chromaticity Diagram

