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THE LIGHT CENTER OF THE INDUSTRY SINCE 1955

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NVLAP LAB CODE: 200925-0

INDEPENDENT TESTING LABORATORIES, INC.
4066 CAMELOT CIRCLE, LONGMONT, CO 80504 USA

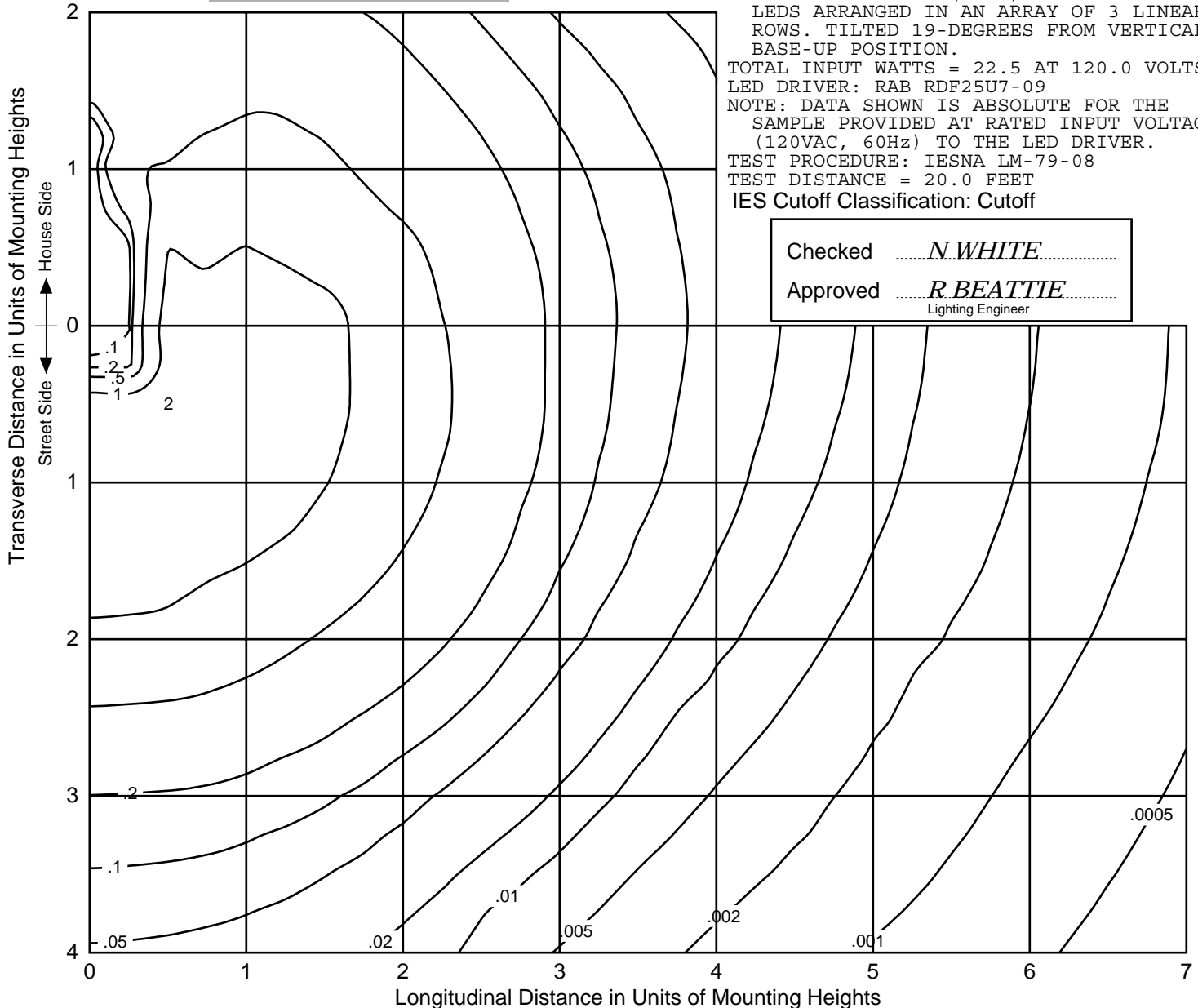
PHONE: (303) 442-1255 • FAX: (970) 535-3114 • E-MAIL: itl@itlboulder.com • WEBSITE: www.itlboulder.com

ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION
Values based on 8 foot mounting height.



REPORT NUMBER: ITL78060
ISSUE DATE: 08/07/13 PAGE: 1 OF 8
PREPARED FOR: RAB LIGHTING, INC.
CATALOG NUMBER: WBLED18 (ROUND WALL MOUNT) / BLEDR18 (42" ROUND BOLLARD)
LUMINAIRE: EXTRUDED BROWN PAINTED CYLINDRICAL METAL LOWER HOUSING WITH FABRICATED BROWN PAINTED METAL MOUNTING ARM, CAST METAL TOP, CAST FINNED METAL HEAT SINK WITH BLACK PAINTED INTERIOR, MOLDED SPECULAR FINISHED PLASTIC REFLECTOR, 3 WHITE CIRCUIT BOARDS EACH WITH 1 LED, CLEAR PLASTIC LENS, CAST BROWN PAINTED METAL BOTTOM. RAB TEST INFORMATION: ROUND WALL MOUNT.
LAMPS: THREE WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDS) EACH CONTAINING LEDES ARRANGED IN AN ARRAY OF 3 LINEAR ROWS. TILTED 19-DEGREES FROM VERTICAL BASE-UP POSITION.
TOTAL INPUT WATTS = 22.5 AT 120.0 VOLTS
LED DRIVER: RAB RDF25U7-09
NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT RATED INPUT VOLTAGE (120VAC, 60Hz) TO THE LED DRIVER.
TEST PROCEDURE: IESNA LM-79-08
TEST DISTANCE = 20.0 FEET
IES Cutoff Classification: Cutoff

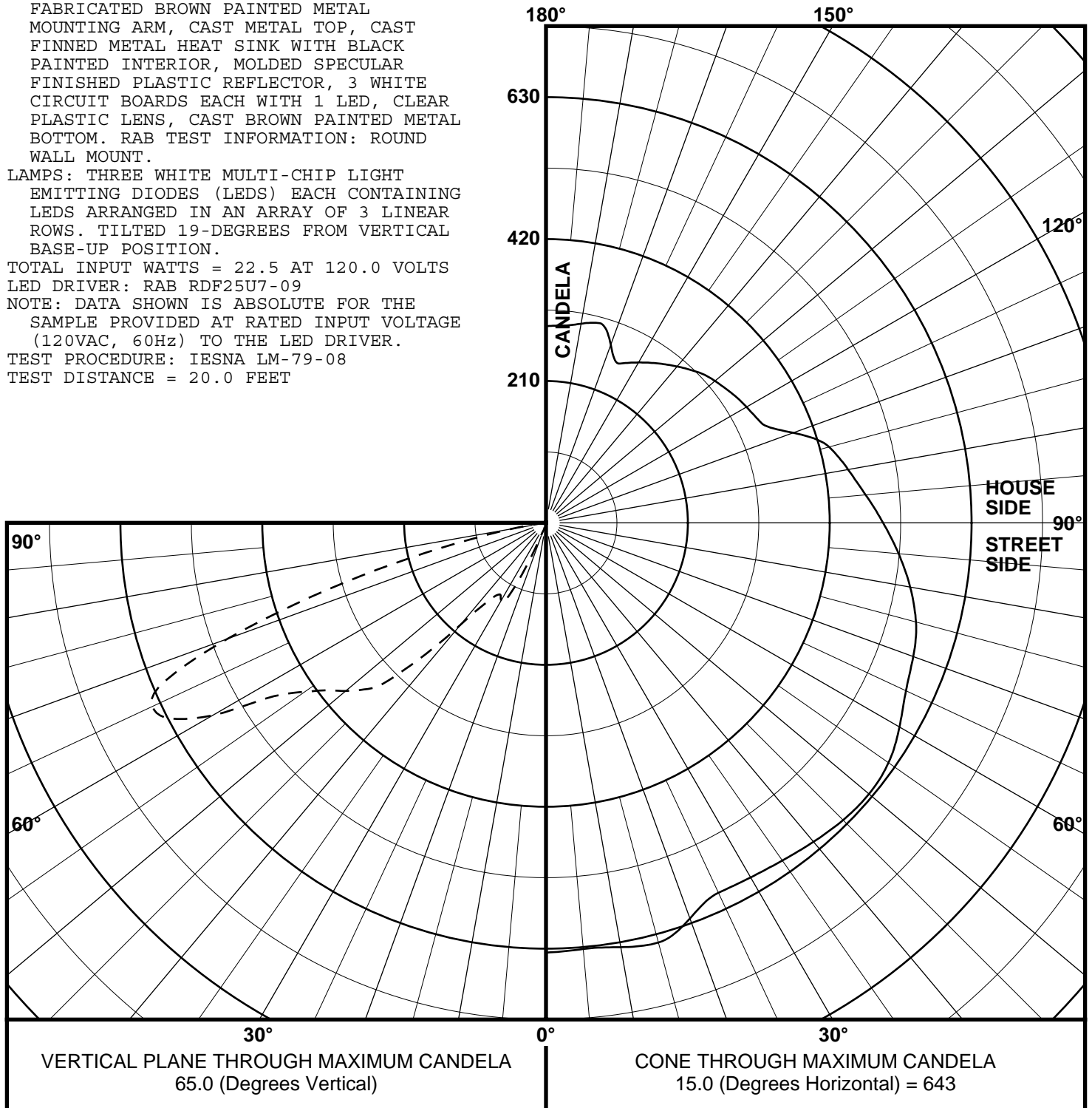
Checked *N. WHITE*
Approved *R. BEATTIE*
Lighting Engineer





REPORT NUMBER: ITL78060
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 TEST DISTANCE = 20.0 FEET

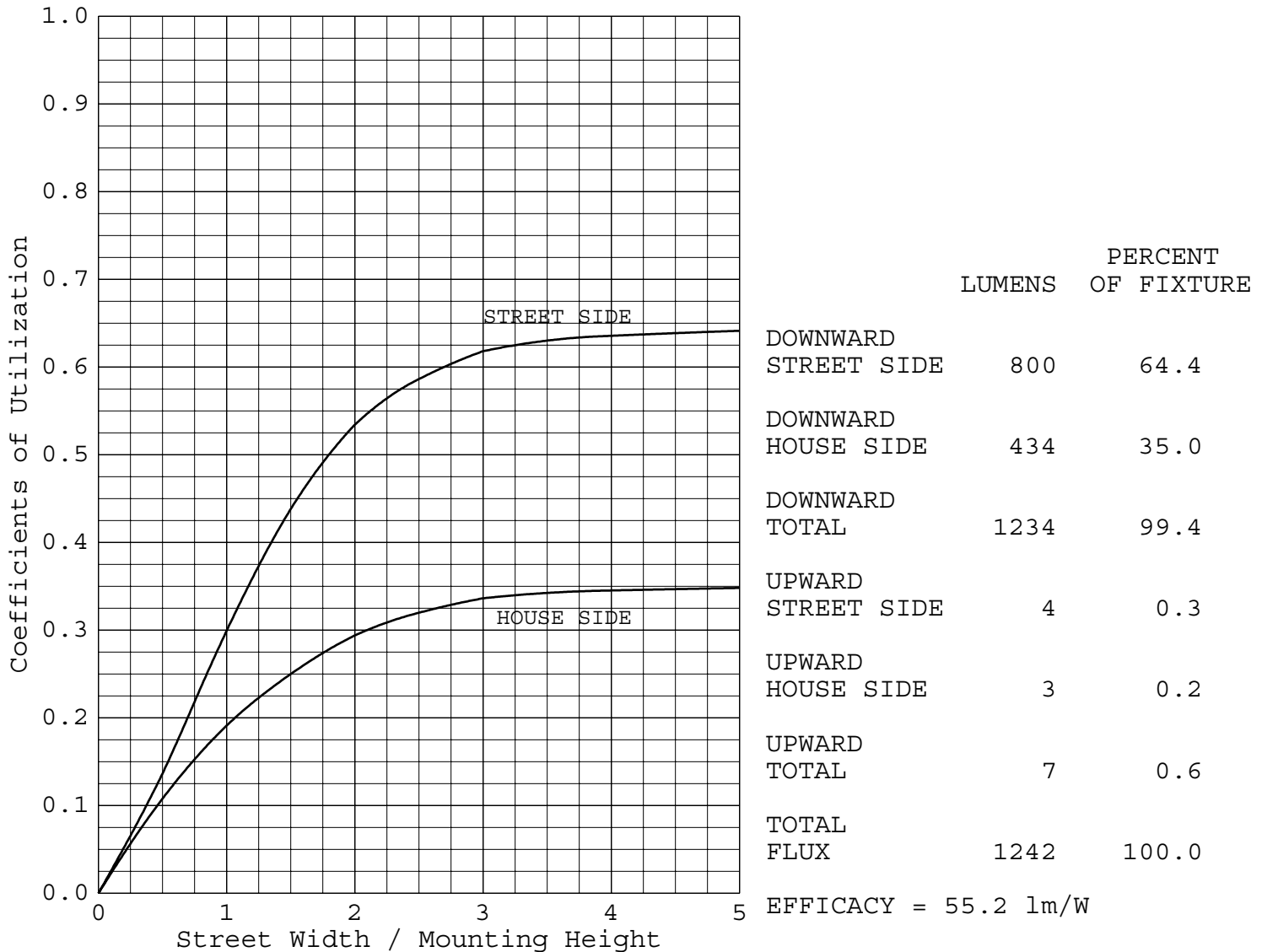
MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA



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COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



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.



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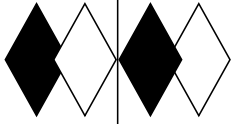
FLUX DISTRIBUTION BY SOLID ANGLE

(PER IESNA TM-15-11, LUMINAIRE CLASSIFICATION SYSTEM FOR OUTDOOR LUMINAIRES)

	LUMENS	PERCENT OF FIXTURE	BUG ZONE RATINGS
FORWARD LIGHT	800.	64.4	
FL (0- 30)	17.6	1.4	
FM (30- 60)	375.5	30.2	
FH (60- 80)	401.6	32.3	G0
FVH(80- 90)	5.4	0.4	G0
BACK LIGHT	434.	35.0	
BL (0- 30)	8.4	0.7	B0
BM (30- 60)	183.9	14.8	B0
BH (60- 80)	237.9	19.2	B1 G1
BVH(80- 90)	4.2	0.3	G0
UPLIGHT	7.	0.6	
UL (90-100)	2.5	0.2	U1
UH (100-180)	4.7	0.4	U1
TRAPPED LIGHT	0.	0.0	
TOTAL FLUX	1242.	100.0	

BACKLIGHT, UPLIGHT, AND GLARE (BUG) RATINGS
(PER ADDENDUM A FOR IESNA TM-15-11)

BUG RATING: B1 U1 G1



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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	90.0
	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	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
	135.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
	125.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
	115.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
	105.0	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
	95.0	3.	3.	3.	3.	3.	3.	3.	3.	2.	2.
	92.5	4.	4.	4.	4.	4.	3.	3.	3.	3.	3.
	90.0	4.	4.	4.	4.	4.	4.	3.	3.	3.	3.
	87.5	5.	5.	5.	5.	5.	4.	4.	4.	4.	4.
	85.0	6.	6.	7.	6.	6.	6.	7.	7.	8.	8.
V	82.5	11.	10.	11.	10.	9.	10.	12.	13.	14.	16.
E	80.0	38.	38.	52.	40.	20.	18.	22.	24.	30.	33.
R	77.5	133.	128.	121.	92.	60.	56.	57.	70.	82.	98.
T	75.0	246.	242.	233.	208.	175.	180.	176.	180.	195.	202.
I	72.5	358.	354.	365.	356.	360.	380.	372.	346.	327.	308.
C	70.0	471.	471.	501.	522.	521.	542.	544.	507.	467.	412.
A	67.5	583.	581.	609.	612.	600.	609.	609.	587.	559.	499.
L	65.0<<	636.	633.	643.	604.	610.	622.	619.	588.	567.	524.
	62.5	623.	614.	627.	574.	590.	601.	597.	568.	544.	500.
A	60.0	571.	574.	570.	537.	556.	567.	562.	531.	508.	471.
N	57.5	550.	548.	477.	497.	516.	527.	518.	489.	469.	446.
G	55.0	537.	505.	436.	457.	473.	482.	471.	447.	435.	422.
L	52.5	483.	435.	407.	419.	428.	433.	424.	407.	403.	404.
E	50.0	359.	384.	387.	382.	386.	382.	379.	367.	373.	360.
	47.5	288.	312.	365.	347.	344.	340.	338.	329.	348.	281.
	45.0	255.	253.	330.	326.	306.	298.	295.	304.	314.	227.
	42.5	226.	221.	263.	307.	275.	255.	261.	284.	246.	198.
	40.0	193.	189.	197.	262.	252.	233.	241.	250.	178.	170.
	37.5	159.	156.	154.	203.	237.	231.	236.	193.	141.	143.
	35.0	137.	135.	133.	153.	213.	240.	216.	143.	125.	126.
	32.5	129.	127.	126.	133.	180.	224.	177.	128.	121.	120.
	30.0	135.	133.	133.	134.	140.	147.	131.	128.	127.	126.
	25.0	100.	95.	85.	63.	34.	20.	30.	55.	76.	86.
	20.0	16.	16.	14.	12.	10.	10.	10.	11.	13.	14.
	15.0	9.	9.	8.	8.	8.	8.	7.	7.	7.	7.
	10.0	7.	7.	7.	7.	6.	6.	6.	6.	6.	5.
	5.0	6.	5.	5.	5.	5.	5.	5.	5.	4.	4.
	0.0	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.

PLANE OF MAXIMUM CANDELA

CONE OF MAXIMUM CANDELA



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CANDELA TABULATION

	HOUSE SIDE		LATERAL ANGLE							
	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	1.	1.	1.	1.	1.	0.	0.	0.	0.	0.
135.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
125.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	2.
115.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
105.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
95.0	2.	2.	2.	2.	1.	1.	1.	1.	1.	1.
92.5	2.	2.	2.	2.	2.	1.	1.	1.	1.	1.
90.0	3.	3.	2.	2.	2.	2.	2.	2.	2.	2.
87.5	4.	3.	3.	3.	2.	2.	2.	2.	2.	2.
85.0	8.	6.	5.	4.	3.	2.	2.	2.	2.	2.
V 82.5	16.	14.	18.	8.	6.	4.	11.	4.	4.	4.
E 80.0	38.	49.	41.	16.	13.	9.	24.	37.	21.	21.
R 77.5	111.	98.	84.	45.	30.	25.	51.	69.	72.	82.
T 75.0	205.	200.	171.	126.	109.	89.	94.	121.	115.	111.
I 72.5	310.	293.	265.	232.	218.	191.	168.	176.	158.	153.
C 70.0	394.	370.	339.	306.	294.	272.	251.	250.	210.	204.
A 67.5	449.	414.	360.	325.	320.	299.	282.	300.	271.	265.
L 65.0<<	475.	434.	351.	335.	316.	288.	260.	306.	293.	291.
62.5	475.	447.	341.	327.	302.	264.	225.	276.	248.	242.
A 60.0	460.	406.	330.	312.	282.	238.	193.	192.	213.	201.
N 57.5	444.	338.	314.	291.	259.	210.	166.	128.	185.	198.
G 55.0	393.	312.	293.	268.	231.	186.	143.	109.	90.	4.
L 52.5	318.	288.	268.	240.	205.	164.	128.	102.	92.	1.
E 50.0	279.	261.	239.	214.	182.	145.	115.	103.	72.	1.
47.5	249.	234.	214.	191.	163.	130.	106.	109.	30.	1.
45.0	221.	206.	191.	171.	144.	117.	106.	93.	7.	1.
42.5	196.	182.	168.	151.	126.	109.	109.	53.	4.	1.
40.0	168.	156.	142.	132.	118.	110.	94.	21.	3.	1.
37.5	143.	134.	124.	119.	115.	110.	60.	9.	3.	1.
35.0	126.	121.	115.	116.	116.	88.	28.	5.	3.	2.
32.5	120.	119.	117.	118.	102.	48.	12.	4.	3.	2.
30.0	126.	125.	117.	102.	62.	20.	7.	4.	3.	3.
25.0	85.	73.	46.	24.	11.	6.	4.	3.	4.	4.
20.0	14.	11.	8.	6.	5.	4.	4.	4.	4.	4.
15.0	6.	6.	5.	4.	3.	3.	3.	3.	4.	4.
10.0	5.	4.	3.	3.	3.	3.	3.	3.	3.	3.
5.0	4.	3.	3.	2.	2.	2.	2.	2.	2.	2.
0.0	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.

CONE OF MAXIMUM CANDELA



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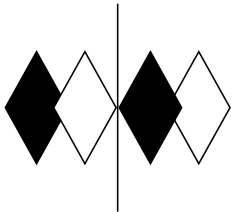
PAGE: 7 OF 8

5-DEGREE
 ZONAL LUMEN SUMMARY

0- 5	0
5- 10	0
10- 15	1
15- 20	1
20- 25	5
25- 30	19
30- 35	32
35- 40	47
40- 45	70
45- 50	100
50- 55	135
55- 60	175
60- 65	218
65- 70	226
70- 75	149
75- 80	46
80- 85	8
85- 90	2
90- 95	1
95-100	1
100-105	1
105-110	1
110-115	1
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	0
0- 20	2
0- 30	26
0- 40	106
0- 50	275
0- 60	585
0- 70	1029
0- 80	1225
0- 90	1234
0-100	1237
0-110	1239
0-120	1240
0-130	1241
0-140	1241
0-150	1242
0-160	1242
0-170	1242
0-180	1242



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ADDRESS: 170 LUDLOW AVE
NORTHVALE, NJ 07647

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DATE: 08/14/13
PREPARED FOR: RAB LIGHTING, INC.
CATALOG NUMBER: WBLED18 (ROUND WALL MOUNT) / BLEDR18 (42" ROUND BOLLARD)

ADDRESS: 170 LUDLOW AVE
NORTHVALE, NJ 07647

LUMINAIRE: EXTRUDED BROWN PAINTED CYLINDRICAL METAL LOWER HOUSING WITH FABRICATED BROWN PAINTED METAL MOUNTING ARM, CAST METAL TOP, CAST FINNED METAL HEAT SINK WITH BLACK PAINTED INTERIOR, MOLDED SPECULAR FINISHED PLASTIC REFLECTOR, 3 WHITE CIRCUIT BOARDS EACH WITH 1 LED, CLEAR PLASTIC LENS, CAST BROWN PAINTED METAL BOTTOM. RAB TEST INFORMATION: ROUND WALL MOUNT.

LAMP: THREE WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDS) EACH CONTAINING LEDES ARRANGED IN AN ARRAY OF 3 LINEAR ROWS. TILTED 19-DEGREES FROM VERTICAL BASE-UP POSITION.

DRIVER: RAB RDF25U7-09

NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT RATED INPUT VOLTAGE (120.0 AND 277.0 VAC, 60Hz) TO THE LED DRIVER.

		Calibration Due:
INSTRUMENTS:	Associated Power Technologies APT5010 AC Power Source	N/A
	Yokogawa WT210 Digital Power Meter #8	01/31/14
	Ocean Optics QE65000 Spectroradiometer	03/14/14
	ITL 1.5m Diameter Integrating Sphere S15-2, 4PI Geometry	03/14/14

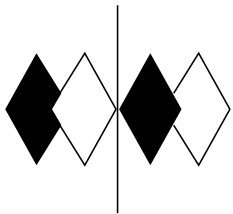
OBJECT OF TEST: Measure the Total Radiant Flux*, Spectral Power Distribution (SPD), Correlated Color Temperature (CCT), Color Rendering Indices (CRIa,1-14), Chromaticity Coordinates (x,y; u'v'), ANSI C78.377 Duv, and electrical data including ANSI C82.77-2002 Power Factor (PF) and Total Harmonic Distortion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

PROCEDURE: The test sample was provided by the customer and had an unknown number of operating hours. The test sample was mounted inside the integrating sphere 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 120.0 VAC input. Electrical data was also recorded at maximum nominal rated input voltage (277.0 VAC). All testing performed in a 25 +/-1 degree Celsius free air ambient and in accordance with IESNA LM-79-08. 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.

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Checked	<u>P O'CONNOR</u>
Approved	<u>L GRABA</u> Lighting Engineer



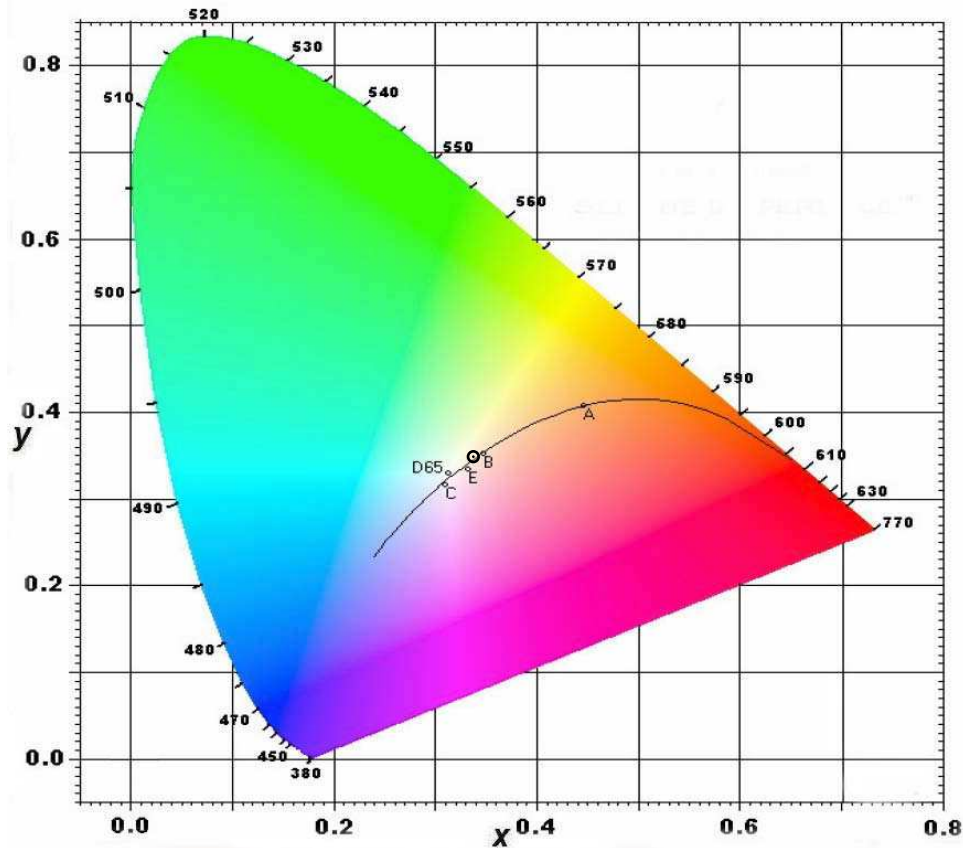
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CIE Chromaticity Diagram





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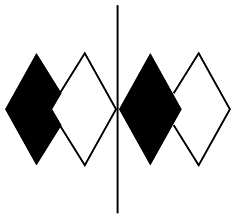
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RESULTS:

SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3372
Chromaticity Ordinate y	0.3484
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2073
Chromaticity Ordinate v'	0.4819
Correlated Color Temp CCT (K)	5306
ANSI C78.377-2008 Duv	0.002
Total Radiant Flux (milliWatts)	3859 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.191
Input Power (Watts)	22.5
Input Power Factor (%)	98.2
Input Current THD (%)	16.1
Input Voltage THD (%)	0.2
Off-State Power (Watts)	
	0.0
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.106
Input Power (Watts)	23.2
Input Power Factor (%)	79.0
Input Current THD (%)	23.5
Input Voltage THD (%)	0.2

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	71
R1 Light greyish red	70
R2 Dark greyish yellow	74
R3 Strong yellowish green	75
R4 Moderate yellowish green	72
R5 Light bluish green	70
R6 Light blue	64
R7 Light violet	80
R8 Light reddish purple	61
R9 Strong red	-20
R10 Strong yellow	37
R11 Strong green	69
R12 Strong blue	40
R13 Light yellowish pink (skin)	69
R14 Moderate olive green (leaf)	86

*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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REPORT NUMBER: ITL78066
DATE: 08/14/13
PREPARED FOR: RAB LIGHTING, INC.
CATALOG NUMBER: WBLEDR18 (ROUND WALL MOUNT) / BLEDR18 (42" ROUND BOLLARD)

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.154	515	13.299	650	8.275
385	0.185	520	15.495	655	7.545
390	0.231	525	17.319	660	6.858
395	0.299	530	18.709	665	6.215
400	0.421	535	19.688	670	5.616
405	0.724	540	20.352	675	5.064
410	1.324	545	20.817	680	4.564
415	2.388	550	21.072	685	4.097
420	4.329	555	21.173	690	3.674
425	7.467	560	21.126	695	3.298
430	11.945	565	20.958	700	2.949
435	17.509	570	20.688	705	2.634
440	24.391	575	20.302	710	2.354
445	32.045	580	19.827	715	2.104
450	32.981	585	19.293	720	1.879
455	23.781	590	18.671	725	1.677
460	14.624	595	17.960	730	1.492
465	9.698	600	17.164	735	1.333
470	6.449	605	16.322	740	1.190
475	4.382	610	15.427	745	1.063
480	3.464	615	14.490	750	0.948
485	3.211	620	13.522	755	0.849
490	3.507	625	12.561	760	0.759
495	4.490	630	11.631	765	0.681
500	6.144	635	10.723	770	0.610
505	8.344	640	9.865	775	0.546
510	10.832	645	9.054	780	0.489

