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THE LIGHT CENTER OF THE INDUSTRY SINCE 1955

PHONE: (303) 442-1255

FAX: (970) 535-3114

E-MAIL: itl@itlboulder.com

WEBSITE: www.itlboulder.com

NVLAP
NVLAP LAB CODE: 200925-0

INDEPENDENT TESTING LABORATORIES, INC.

4066 CAMELOT CIRCLE, LONGMONT, CO 80504 USA

ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

Values based on 12 foot mounting height.



REPORT NUMBER: ITL79964

ISSUE DATE: 11/25/13

PAGE: 1 OF 7

PREPARED FOR: RAB LIGHTING, INC.

CATALOG NUMBER: GLED78N OR GPLED78N (W/ PRISMATIC LENS - CEILING OR PENDENT MOUNT)

LUMINAIRE: CAST 2-PIECE BROWN PAINTED FINNED METAL HOUSING, 6 CAST METAL HEAT SINKS/CIRCUIT BOARD MOUNTING BRACKETS, 6 CIRCUIT BOARDS EACH WITH 1 LED AND MOLDED PLASTIC CIRCUIT BOARD PERIMETER OVERLAY WITH SPECULAR FINISH, MOLDED PLASTIC REFLECTOR WITH SPECULAR FINISH AND 1 APERTURE PER LED, CLEAR PLASTIC DROP LENS WITH RADIALLY PRISMATIC BOTTOM AND PRISMATIC SIDES IN CAST BROWN PAINTED METAL FRAME. LENS RADIAL PRISMS IN, AND SIDE PRISMS IN AND OUT.

LAMPS: SIX WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDs), AIMED AT THE HORIZON.

TOTAL INPUT WATTS = 89.1 AT 120.0 VOLTS
LED DRIVERS: THREE RAB RD26S

NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT RATED INPUT VOLTAGE (120VAC, 60Hz) TO THE LED DRIVERS. LED DRIVER INFORMATION PROVIDED BY CLIENT.

TEST PROCEDURE: IESNA LM-79-08

TEST DISTANCE = 20.0 FEET

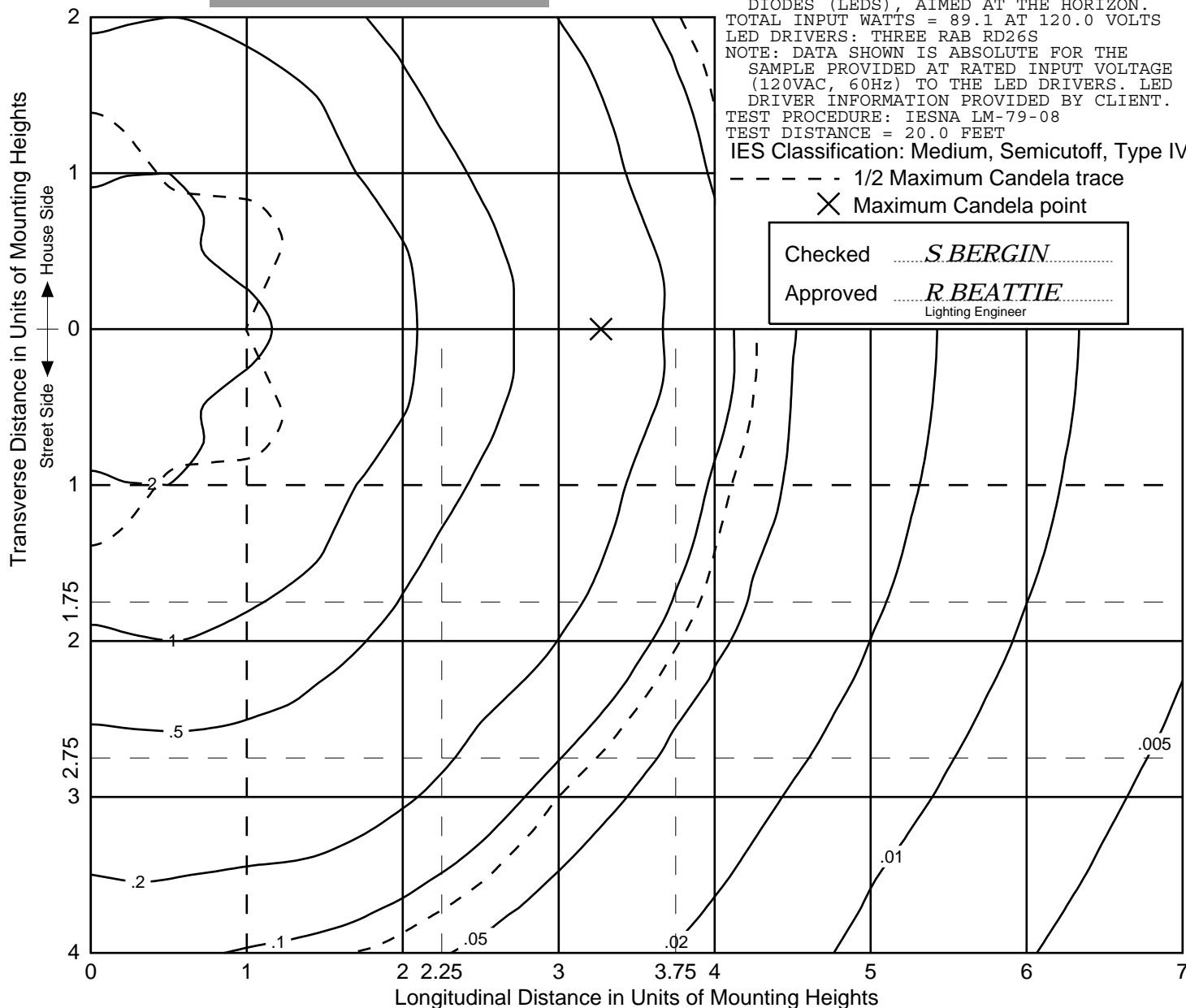
IES Classification: Medium, Semicutoff, Type IV

--- 1/2 Maximum Candela trace

× Maximum Candela point

Checked *S. BERGIN*

Approved *R. BEATTIE*
Lighting Engineer



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CATALOG NUMBER: GLED78N OR GPLED78N (W/
PRISMATIC LENS - CEILING OR PENDENT
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LED AND MOLDED PLASTIC CIRCUIT BOARD
PERIMETER OVERLAY WITH SPECULAR
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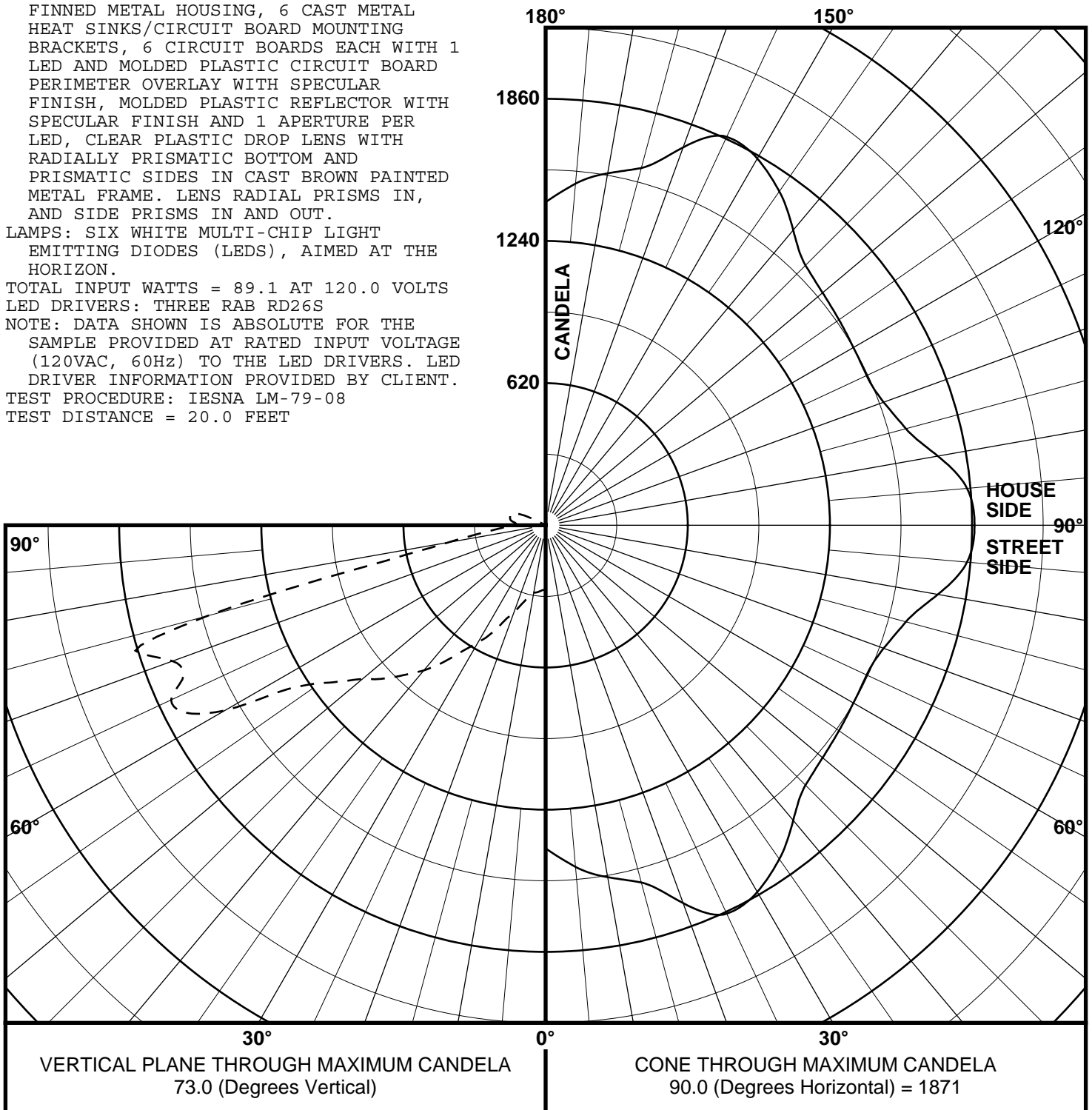
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NOTE: DATA SHOWN IS ABSOLUTE FOR THE
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(120VAC, 60Hz) TO THE LED DRIVERS. LED
DRIVER INFORMATION PROVIDED BY CLIENT.

TEST PROCEDURE: IESNA LM-79-08

TEST DISTANCE = 20.0 FEET

MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA





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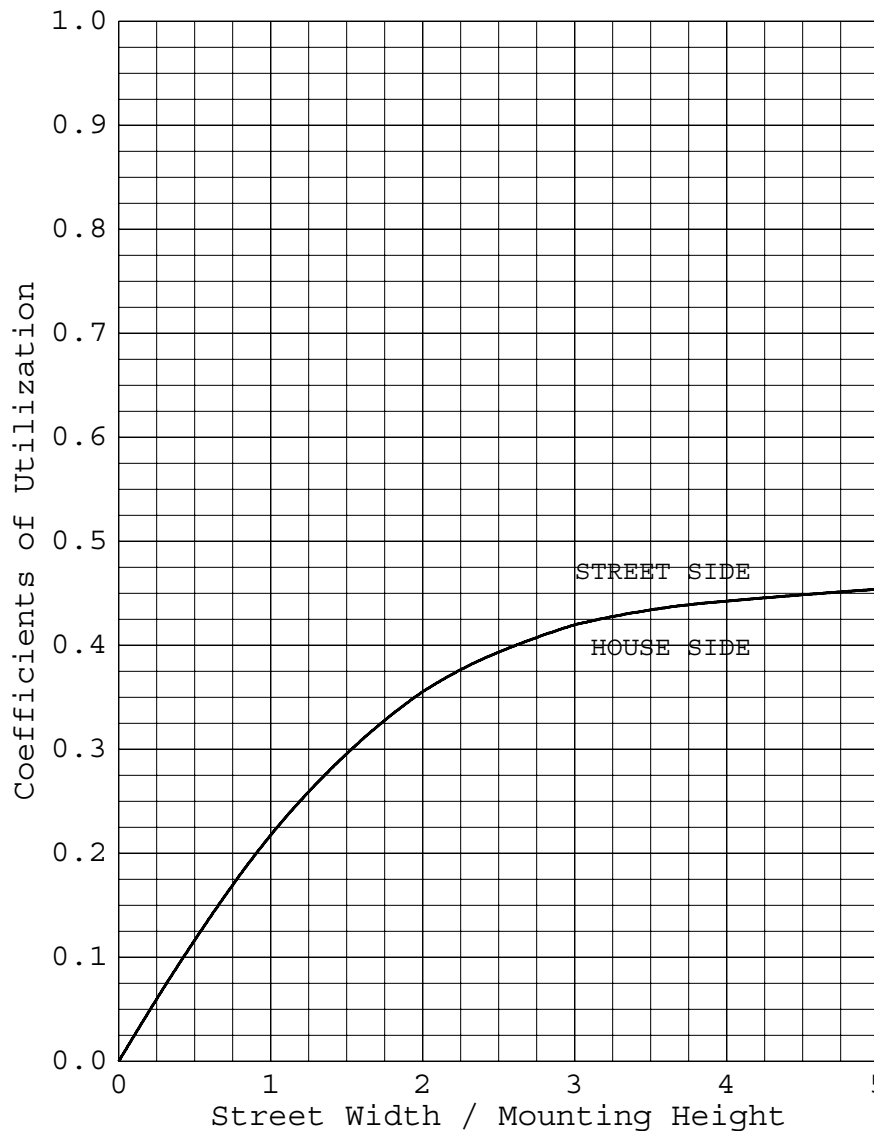
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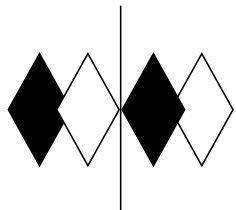
COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	2809	46.9
DOWNWARD HOUSE SIDE	2809	46.9
DOWNWARD TOTAL	5618	93.8
UPWARD STREET SIDE	184	3.1
UPWARD HOUSE SIDE	184	3.1
UPWARD TOTAL	368	6.2
TOTAL FLUX	5986	100.0

EFFICACY = 67.2 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.



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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	2809.	46.9	
FL (0- 30)	178.7	3.0	
FM (30- 60)	1040.0	17.4	
FH (60- 80)	1461.7	24.4	G1
FVH(80- 90)	128.7	2.1	G2
BACK LIGHT	2809.	46.9	
BL (0- 30)	178.7	3.0	B1
BM (30- 60)	1040.0	17.4	B2
BH (60- 80)	1461.7	24.4	B3 G1
BVH(80- 90)	128.7	2.1	G2
UPLIGHT	368.	6.2	
UL (90-100)	141.8	2.4	U3
UH (100-180)	226.4	3.8	U3
TRAPPED LIGHT	0.	0.0	
TOTAL FLUX	5986.	100.0	

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

BUG RATING: B3 U3 G2

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CANDELA TABULATION

		LATERAL ANGLE										
		0.0	5.0	15.0	25.0	35.0	45.0	55.0	65.0	75.0	85.0	90.0
V E R T I C A L A N G L E	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	81.	78.	82.	87.	89.	83.	83.	84.	85.	93.	91.
	105.0	128.	129.	137.	149.	149.	138.	133.	134.	143.	156.	158.
	95.0	117.	118.	124.	134.	134.	124.	118.	119.	125.	136.	136.
	92.5	112.	114.	119.	128.	127.	119.	114.	114.	120.	129.	129.
	90.0	125.	127.	131.	140.	139.	131.	126.	126.	132.	139.	141.
	87.5	157.	160.	165.	174.	172.	163.	159.	159.	166.	173.	175.
	85.0	199.	205.	215.	225.	223.	213.	203.	203.	217.	223.	226.
	82.5	264.	276.	293.	305.	301.	286.	268.	269.	287.	300.	304.
	80.0	418.	432.	450.	453.	435.	427.	381.	396.	415.	428.	431.
	77.5	778.	788.	755.	803.	797.	752.	726.	738.	716.	700.	711.
	75.0	1366.	1433.	1380.	1585.	1553.	1347.	1472.	1496.	1370.	1596.	1527.
	73.0	1409.	1495.	1613.	1869.	1777.	1603.	1562.	1545.	1627.	1845.	1871.
	72.5	1399.	1491.	1624.	1857.	1780.	1618.	1545.	1535.	1644.	1834.	1856.
	70.0	1432.	1504.	1647.	1750.	1708.	1636.	1531.	1550.	1650.	1754.	1732.
	67.5	1459.	1490.	1642.	1707.	1689.	1664.	1531.	1525.	1659.	1725.	1709.
	65.0	1486.	1505.	1773.	1779.	1778.	1793.	1593.	1597.	1821.	1812.	1802.
	62.5	1458.	1528.	1716.	1701.	1703.	1693.	1559.	1583.	1754.	1752.	1770.
	60.0	1308.	1383.	1476.	1521.	1514.	1437.	1375.	1378.	1501.	1577.	1615.
	57.5	1121.	1159.	1297.	1279.	1278.	1268.	1137.	1146.	1327.	1330.	1327.
	55.0	967.	1007.	1152.	1157.	1150.	1134.	977.	984.	1177.	1183.	1201.
	52.5	842.	888.	1010.	1072.	1073.	996.	867.	869.	1026.	1098.	1118.
	50.0	744.	788.	933.	1008.	1017.	917.	759.	769.	937.	1025.	1043.
	47.5	709.	728.	883.	958.	963.	873.	690.	715.	883.	968.	993.
	45.0	713.	718.	836.	909.	914.	831.	678.	705.	836.	916.	937.
	42.5	690.	705.	793.	859.	870.	797.	669.	689.	797.	868.	878.
40.0	673.	694.	756.	810.	817.	760.	666.	682.	761.	815.	826.	
37.5	687.	694.	714.	751.	757.	716.	680.	692.	720.	758.	765.	
35.0	671.	665.	671.	686.	695.	675.	661.	669.	681.	695.	697.	
30.0	594.	588.	571.	580.	582.	585.	578.	587.	581.	589.	590.	
25.0	498.	493.	479.	481.	491.	488.	503.	506.	491.	489.	491.	
20.0	414.	412.	398.	391.	395.	403.	416.	415.	403.	402.	403.	
15.0	343.	342.	337.	332.	336.	345.	352.	350.	344.	338.	338.	
10.0	305.	303.	301.	300.	300.	302.	302.	301.	299.	299.	299.	
5.0	291.	291.	291.	292.	291.	289.	289.	289.	289.	289.	289.	
0.0	282.	282.	282.	282.	282.	282.	282.	282.	282.	282.	282.	
		PLANE OF MAXIMUM CANDELA										
		CONE OF MAXIMUM CANDELA										



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5-DEGREE
ZONAL LUMEN SUMMARY

0- 5	7
5- 10	21
10- 15	38
15- 20	61
20- 25	94
25- 30	136
30- 35	186
35- 40	240
40- 45	290
45- 50	346
50- 55	433
55- 60	585
60- 65	791
65- 70	835
70- 75	843
75- 80	454
80- 85	165
85- 90	93
90- 95	68
95-100	74
100-105	76
105-110	73
110-115	59
115-120	18
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	28
0- 20	128
0- 30	357
0- 40	783
0- 50	1419
0- 60	2437
0- 70	4064
0- 80	5361
0- 90	5618
0-100	5760
0-110	5908
0-120	5986
0-130	5986
0-140	5986
0-150	5986
0-160	5986
0-170	5986
0-180	5986



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ADDRESS: 170 LUDLOW AVE
NORTHVALE, NJ 07647

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DATE: 11/27/13
PREPARED FOR: RAB LIGHTING, INC.
CATALOG NUMBER: GLED78N OR GPLED78N (W/ PRISMATIC LENS - CEILING OR PENDENT MOUNT)

ADDRESS: 170 LUDLOW AVE
NORTHVALE, NJ 07647

LUMINAIRE: CAST 2-PIECE BROWN PAINTED FINNED METAL HOUSING, 6 CAST METAL HEAT SINKS/CIRCUIT BOARD MOUNTING BRACKETS, 6 CIRCUIT BOARDS EACH WITH 1 LED AND MOLDED PLASTIC CIRCUIT BOARD PERIMETER OVERLAY WITH SPECULAR FINISH, MOLDED PLASTIC REFLECTOR WITH SPECULAR FINISH AND 1 APERTURE PER LED, CLEAR PLASTIC DROP LENS WITH RADIALY PRISMATIC BOTTOM AND PRISMATIC SIDES IN CAST BROWN PAINTED METAL FRAME. LENS RADIAL PRISMS IN, AND SIDE PRISMS IN AND OUT.

LAMP: SIX WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDs), AIMED AT THE HORIZON.

DRIVERS: THREE RAB RD26S

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

INSTRUMENTS:	Associated Power Technologies APT5040 AC Power Source	Calibration Due: N/A
	Yokogawa WT210 Digital Power Meter #9	02/28/14
	Ocean Optics QE65000 Spectroradiometer	10/16/14
	ITL 2.0m Diameter Integrating Sphere S20-2, 4PI Geometry	10/16/14

OBJECT OF TEST: Measure the Total Radiant Flux*, Spectral Power Distribution (SPD), Correlated Color Temperature (CCT), Color Rendering Indices (CRI_a,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.

RESULTS: (continued subsequent pages)

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



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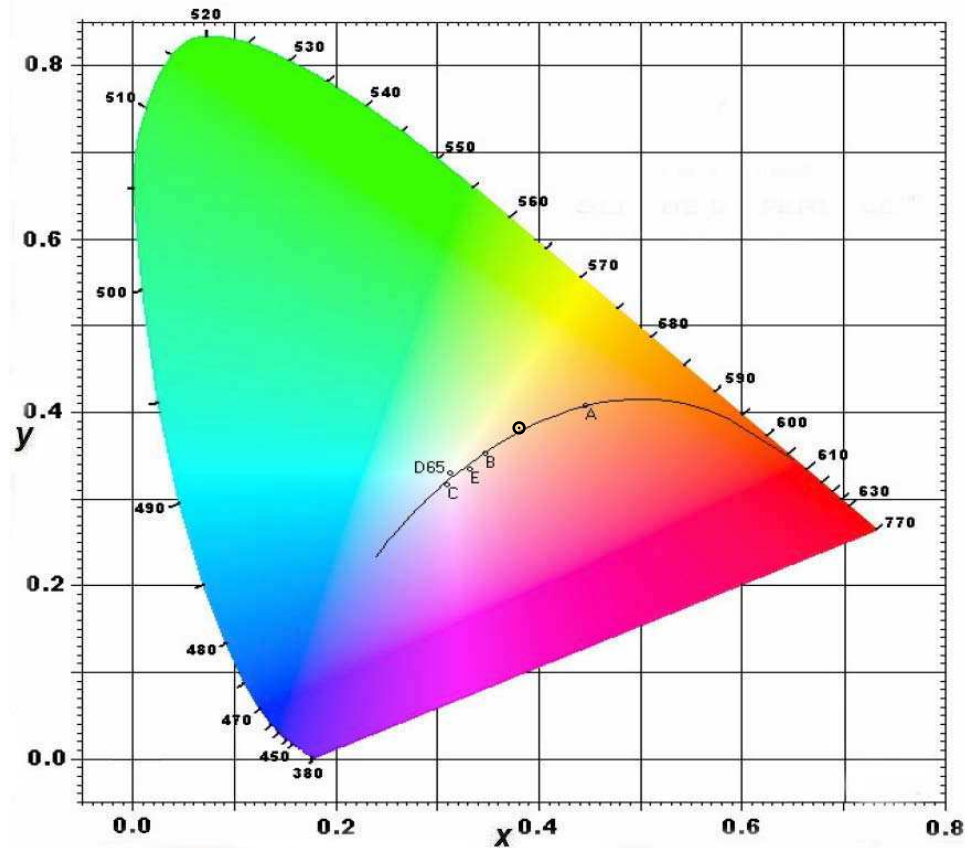
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CIE Chromaticity Diagram





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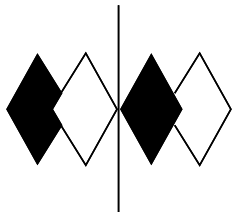
RESULTS:

SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3803
Chromaticity Ordinate y	0.3816
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2231
Chromaticity Ordinate v'	0.5037
Correlated Color Temp CCT (K)	4040
ANSI C78.377-2008 Duv	0.002
Total Radiant Flux (milliWatts)	18194 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.747
Input Power (Watts)	89.2
Input Power Factor (%)	99.5
Input Current THD (%)	8.1
Input Voltage THD (%)	0.1
Off-State Power (Watts)	
0.0	
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.353
Input Power (Watts)	88.8
Input Power Factor (%)	90.8
Input Current THD (%)	11.2
Input Voltage THD (%)	0.1

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	83
R1 Light greyish red	82
R2 Dark greyish yellow	86
R3 Strong yellowish green	90
R4 Moderate yellowish green	85
R5 Light bluish green	83
R6 Light blue	83
R7 Light violet	87
R8 Light reddish purple	68
R9 Strong red	13
R10 Strong yellow	68
R11 Strong green	86
R12 Strong blue	63
R13 Light yellowish pink (skin)	83
R14 Moderate olive green (leaf)	94

*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	0.427	515	72.272	650	54.327
385	0.444	520	76.872	655	48.785
390	0.491	525	79.800	660	43.380
395	0.582	530	81.442	665	38.350
400	0.798	535	82.159	670	33.687
405	1.228	540	82.421	675	29.462
410	2.157	545	82.661	680	25.680
415	4.072	550	83.236	685	22.267
420	8.081	555	84.349	690	19.274
425	15.787	560	85.799	695	16.617
430	28.801	565	87.859	700	14.310
435	48.606	570	90.435	705	12.288
440	78.553	575	93.046	710	10.548
445	107.551	580	95.787	715	9.074
450	102.139	585	98.259	720	7.788
455	71.029	590	100.221	725	6.668
460	48.626	595	101.315	730	5.706
465	35.275	600	101.487	735	4.880
470	25.775	605	100.433	740	4.187
475	21.316	610	98.131	745	3.604
480	21.298	615	94.428	750	3.111
485	24.437	620	89.651	755	2.676
490	30.516	625	84.281	760	2.305
495	39.012	630	78.150	765	1.988
500	48.607	635	72.116	770	1.720
505	57.850	640	66.100	775	1.482
510	65.929	645	60.175	780	1.289

