

itl boulder
THE LIGHT CENTER OF THE INDUSTRY SINCE 1955

PHONE: (303) 442-1255

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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: ITL79977

ISSUE DATE: 11/26/13

PAGE: 1 OF 7

PREPARED FOR: RAB LIGHTING, INC.

CATALOG NUMBER: CLED78 OR PLED78 (W/
CLEAR FLAT GLASS 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 FLAT GLASS LENS IN CAST
BROWN PAINTED METAL FRAME.

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

TOTAL INPUT WATTS = 88.3 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

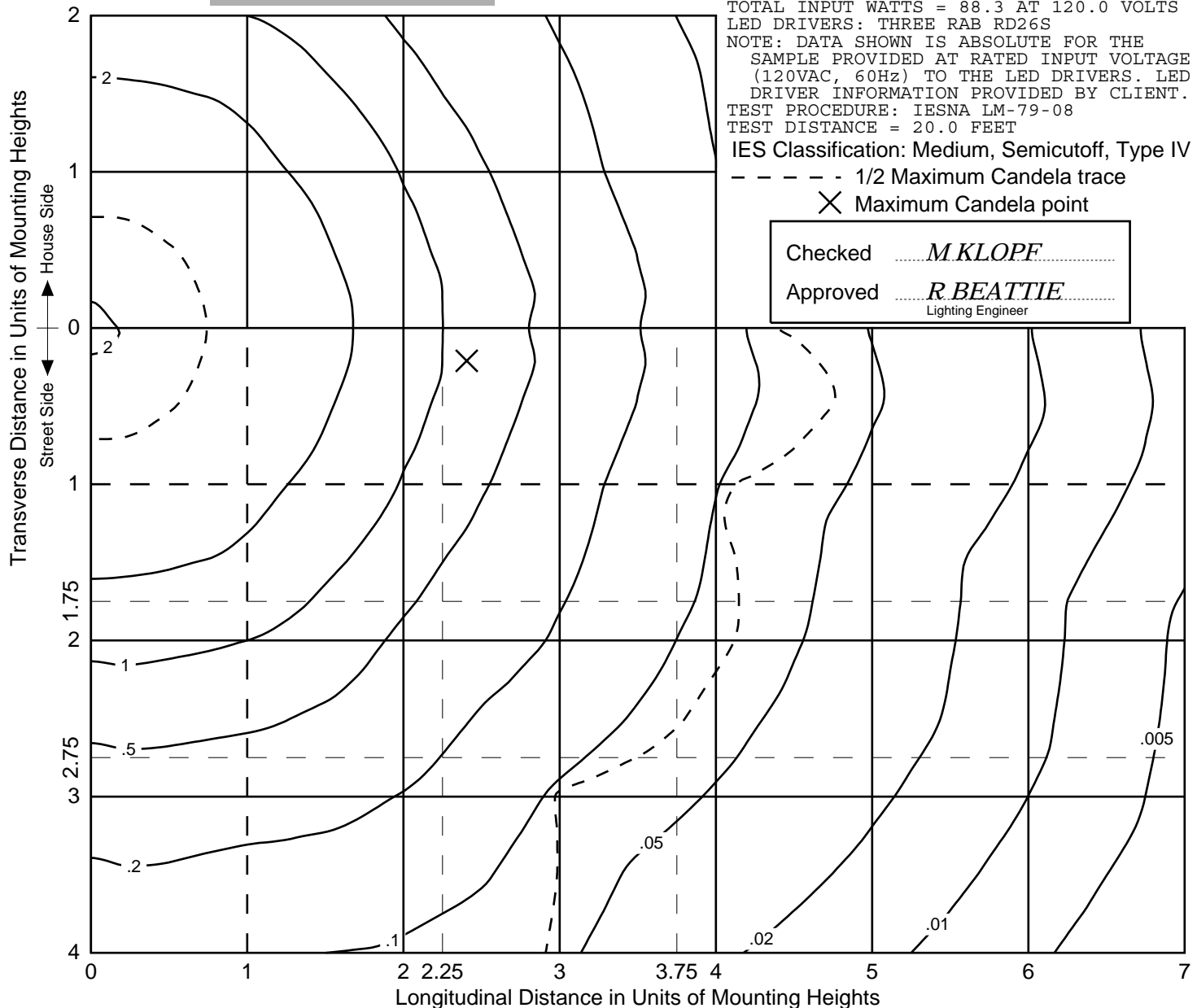
IES Classification: Medium, Semicutoff, Type IV

--- 1/2 Maximum Candela trace

X Maximum Candela point

Checked *M.KLOPF*

Approved *R.BEATTIE*
Lighting Engineer



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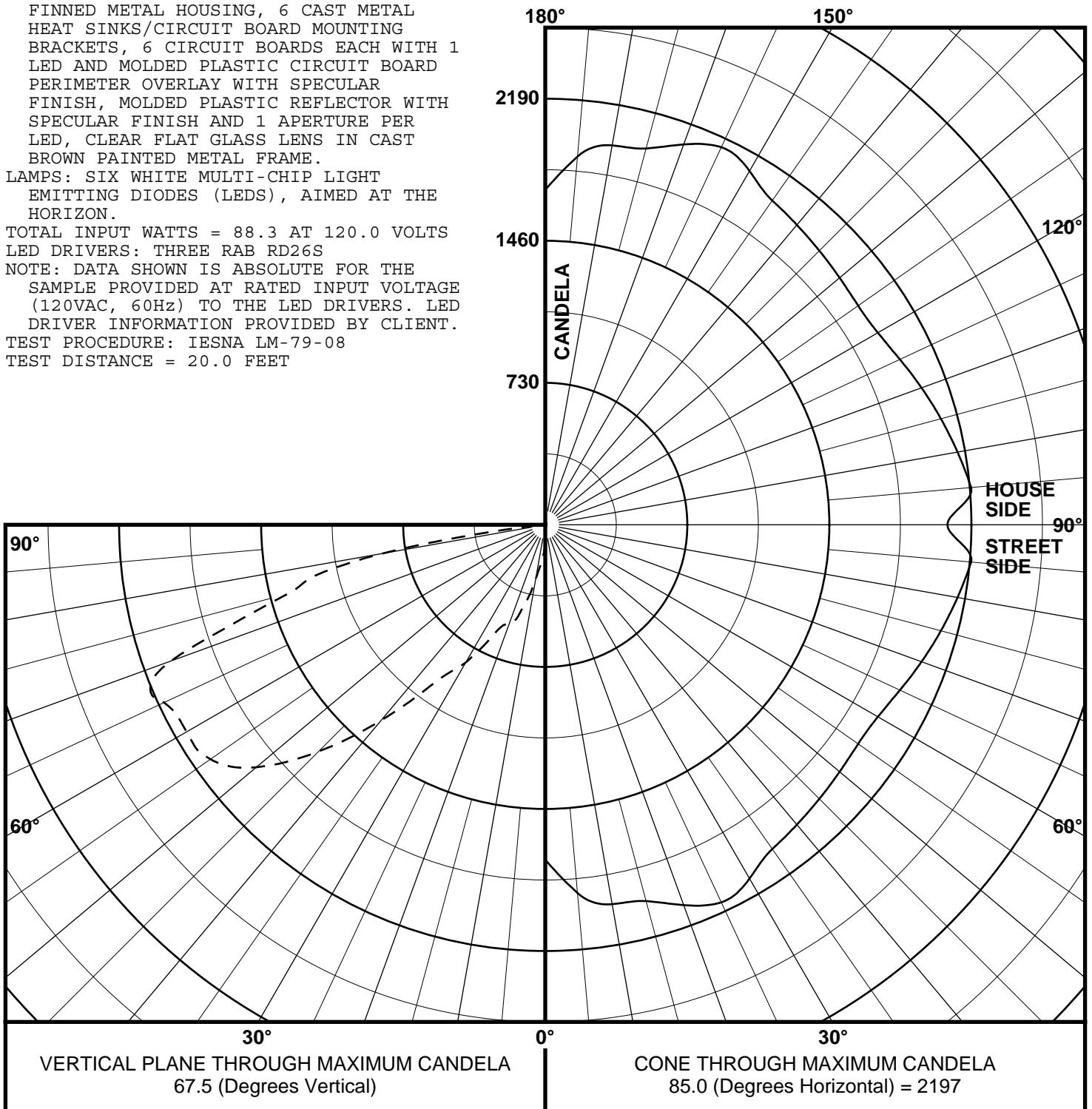
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DRIVER INFORMATION PROVIDED BY CLIENT.

TEST PROCEDURE: IESNA LM-79-08

TEST DISTANCE = 20.0 FEET

MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

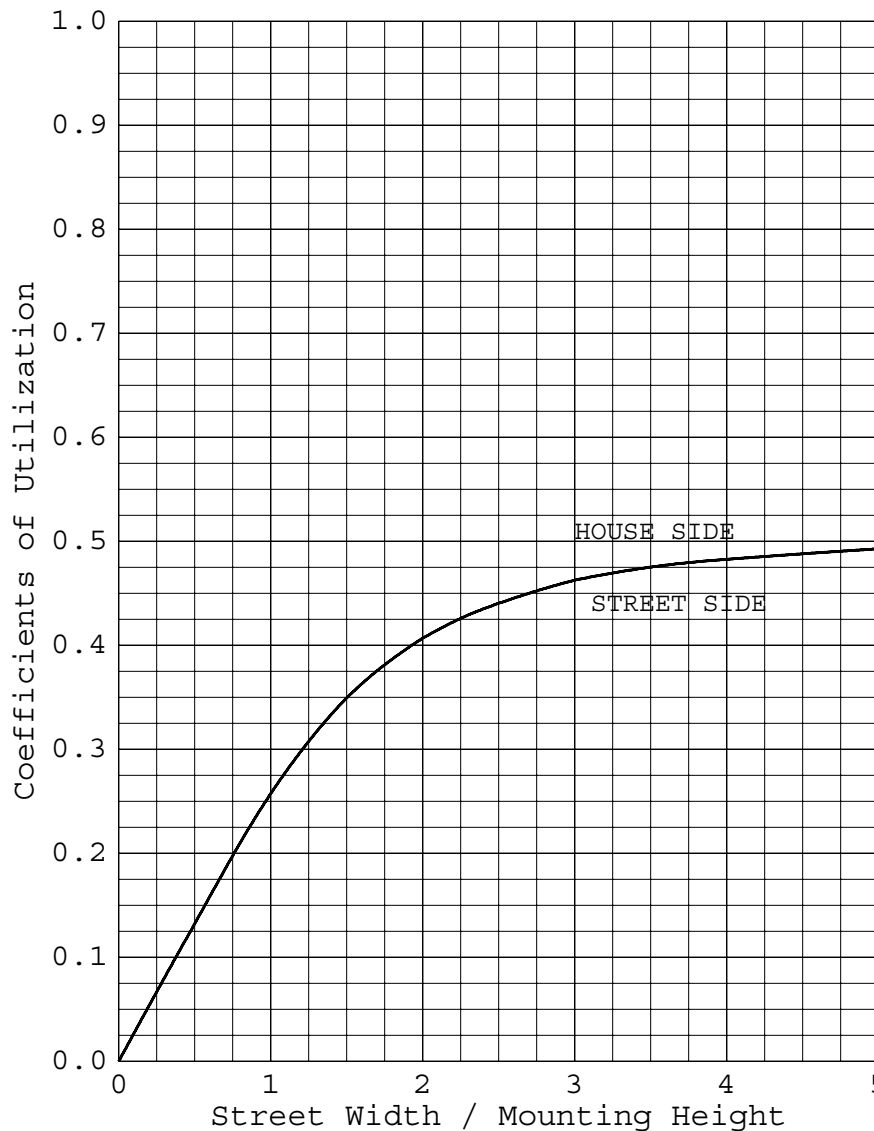




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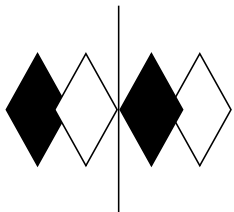
COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	3810	50.0
DOWNWARD HOUSE SIDE	3810	50.0
DOWNWARD TOTAL	7619	100.0
UPWARD STREET SIDE	0	0.0
UPWARD HOUSE SIDE	0	0.0
UPWARD TOTAL	0	0.0
TOTAL FLUX	7619	100.0

EFFICACY = 86.3 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.



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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	3810.	50.0	
FL (0- 30)	226.4	3.0	
FM (30- 60)	1802.5	23.7	
FH (60- 80)	1693.2	22.2	G1
FVH(80- 90)	87.5	1.1	G1
BACK LIGHT	3810.	50.0	
BL (0- 30)	226.4	3.0	B1
BM (30- 60)	1802.5	23.7	B2
BH (60- 80)	1693.2	22.2	B3 G1
BVH(80- 90)	87.5	1.1	G1
UPLIGHT	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	7619.	100.0	

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

BUG RATING: B3 U0 G1



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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
		90.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
		87.5	4.	4.	3.	4.	4.	3.	5.	5.	3.	4.
		85.0	36.	29.	27.	30.	32.	31.	28.	29.	23.	26.
		82.5	246.	242.	196.	255.	267.	200.	243.	266.	187.	282.
		80.0	727.	803.	694.	878.	930.	601.	692.	744.	609.	856.
		77.5	1046.	1225.	1074.	1273.	1290.	1005.	1113.	1130.	1016.	1214.
		75.0	1126.	1286.	1193.	1391.	1385.	1269.	1394.	1331.	1205.	1369.
		72.5	1357.	1422.	1415.	1613.	1752.	1487.	1485.	1400.	1403.	1669.
		70.0	1593.	1687.	1745.	1943.	2007.	1751.	1684.	1747.	1828.	2050.
		67.5<<	1721.	1899.	2002.	2141.	2034.	1992.	1963.	2011.	2105.	2197.
		66.0	1763.	1918.	1968.	2114.	2141.	2087.	2049.	2028.	2052.	2195.
		65.0	1839.	1954.	1941.	2066.	2185.	2082.	2061.	2048.	2023.	2161.
V	62.5	2000.	2015.	1960.	2059.	2118.	2011.	2064.	2101.	2021.	2130.	2116.
E	60.0	2026.	1998.	1974.	2080.	2084.	1999.	2013.	2060.	2023.	2128.	2121.
R	57.5	1928.	1921.	1933.	2085.	2094.	1956.	1930.	1970.	1995.	2131.	2130.
T	55.0	1793.	1836.	1886.	2045.	2060.	1908.	1860.	1876.	1951.	2100.	2084.
I	52.5	1716.	1746.	1824.	1980.	1996.	1856.	1777.	1768.	1871.	2041.	2027.
C	50.0	1658.	1651.	1754.	1887.	1911.	1768.	1677.	1687.	1774.	1938.	1948.
A	47.5	1609.	1571.	1667.	1759.	1782.	1676.	1592.	1604.	1697.	1804.	1815.
L	45.0	1549.	1514.	1555.	1618.	1626.	1548.	1516.	1525.	1573.	1648.	1639.
	42.5	1433.	1429.	1402.	1471.	1477.	1417.	1395.	1433.	1423.	1483.	1492.
A	40.0	1304.	1292.	1272.	1303.	1313.	1285.	1285.	1299.	1287.	1312.	1323.
N	37.5	1198.	1175.	1162.	1143.	1154.	1154.	1184.	1186.	1156.	1146.	1149.
G	35.0	1073.	1063.	1055.	1006.	1005.	1018.	1055.	1064.	1035.	990.	994.
L	32.5	923.	916.	900.	907.	881.	893.	914.	910.	896.	889.	878.
E	30.0	823.	806.	793.	814.	804.	818.	795.	786.	790.	816.	817.
	27.5	740.	718.	698.	696.	751.	742.	741.	732.	724.	718.	717.
	25.0	646.	634.	631.	644.	635.	654.	671.	667.	645.	619.	608.
	22.5	591.	596.	588.	576.	571.	580.	584.	571.	569.	558.	562.
	20.0	524.	530.	536.	538.	542.	542.	544.	527.	519.	536.	536.
	17.5	492.	496.	518.	516.	518.	496.	506.	506.	488.	515.	514.
	15.0	439.	438.	436.	462.	450.	429.	446.	441.	421.	435.	442.
	12.5	383.	373.	363.	379.	380.	369.	369.	375.	367.	367.	364.
	10.0	290.	291.	283.	283.	292.	287.	285.	298.	288.	284.	282.
	7.5	226.	231.	229.	222.	221.	219.	223.	222.	221.	223.	222.
	5.0	184.	185.	180.	176.	179.	183.	184.	186.	179.	179.	176.
	2.5	131.	131.	129.	131.	132.	134.	136.	138.	137.	136.	134.
	0.0	94.	94.	94.	94.	94.	94.	94.	94.	94.	94.	94.
											PLANE OF MAXIMUM CANDELA	
											CONE OF MAXIMUM CANDELA	



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5-DEGREE
ZONAL LUMEN SUMMARY

0- 5	4
5- 10	17
10- 15	44
15- 20	82
20- 25	123
25- 30	184
30- 35	268
35- 40	389
40- 45	532
45- 50	680
50- 55	813
55- 60	924
60- 65	997
65- 70	1006
70- 75	804
75- 80	580
80- 85	170
85- 90	5

10-DEGREE
ZONAL LUMEN SUMMARY

0- 10	20
0- 20	146
0- 30	453
0- 40	1110
0- 50	2322
0- 60	4058
0- 70	6060
0- 80	7444
0- 90	7619



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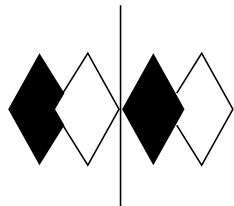
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ADDRESS: 170 LUDLOW AVE
NORTHVALE, NJ 07647

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DATE: 11/27/13
PREPARED FOR: RAB LIGHTING, INC.
CATALOG NUMBER: CLED78 OR PLED78 (W/ CLEAR FLAT GLASS 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 FLAT GLASS LENS IN CAST BROWN PAINTED METAL FRAME.

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:
	Yokogawa WT210 Digital Power Meter #9	N/A
	Ocean Optics QE65000 Spectroradiometer	02/28/14
	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.

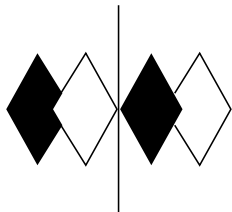
PROCEDURE: The test sample was provided by the customer and had an unknown number of operating hours. The test sample was mounted inside the integrating sphere and allowed to stabilize. After stabilization occurred, measurements were taken. In order to measure mean performance, multiple data sets were 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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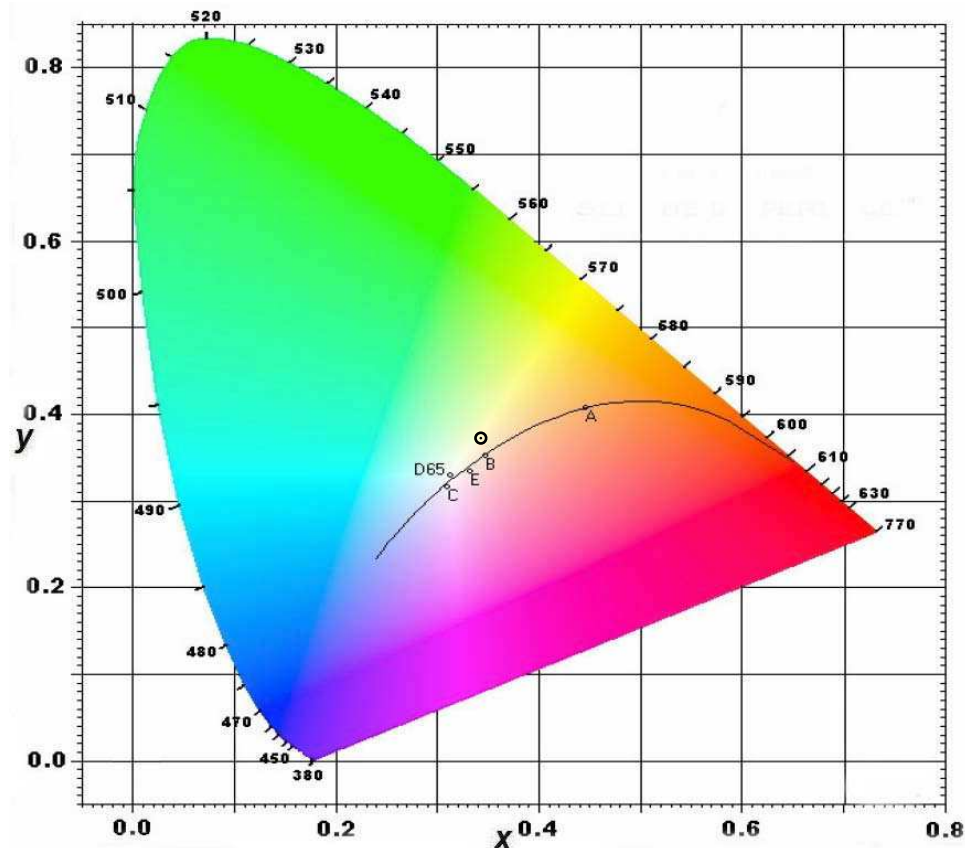
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CIE Chromaticity Diagram





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RESULTS:

SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3426
Chromaticity Ordinate y	0.3721
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2021
Chromaticity Ordinate v'	0.4939
Correlated Color Temp CCT (K)	5148
ANSI C78.377-2008 Duv	0.011
Total Radiant Flux (milliWatts)	21882 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.741
Input Power (Watts)	88.4
Input Power Factor (%)	99.4
Input Current THD (%)	8.0
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)	0.350
Input Power (Watts)	88.0
Input Power Factor (%)	90.8
Input Current THD (%)	10.5
Input Voltage THD (%)	0.1

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	67
R1 Light greyish red	62
R2 Dark greyish yellow	71
R3 Strong yellowish green	78
R4 Moderate yellowish green	67
R5 Light bluish green	63
R6 Light blue	61
R7 Light violet	80
R8 Light reddish purple	52
R9 Strong red	-48
R10 Strong yellow	32
R11 Strong green	62
R12 Strong blue	31
R13 Light yellowish pink (skin)	63
R14 Moderate olive green (leaf)	87

*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	0.598	515	82.991	650	43.550
385	0.641	520	98.228	655	39.068
390	0.746	525	110.379	660	34.938
395	0.935	530	119.444	665	31.179
400	1.338	535	125.483	670	27.711
405	2.189	540	129.477	675	24.586
410	4.040	545	131.669	680	21.820
415	7.745	550	132.590	685	19.299
420	14.669	555	132.469	690	17.027
425	26.705	560	131.539	695	15.038
430	45.600	565	130.184	700	13.235
435	71.644	570	127.941	705	11.665
440	107.475	575	124.940	710	10.237
445	156.190	580	121.410	715	8.999
450	182.954	585	117.275	720	7.892
455	146.928	590	112.626	725	6.920
460	92.108	595	107.281	730	6.073
465	60.365	600	101.652	735	5.333
470	40.893	605	95.670	740	4.669
475	27.234	610	89.530	745	4.106
480	20.389	615	83.334	750	3.620
485	18.286	620	76.988	755	3.180
490	19.440	625	70.845	760	2.785
495	24.749	630	64.713	765	2.446
500	34.960	635	58.945	770	2.155
505	49.229	640	53.541	775	1.901
510	66.016	645	48.410	780	1.669

