

itl boulder
THE LIGHT CENTER OF THE INDUSTRY SINCE 1955

PHONE: (303) 442-1255

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E-MAIL: itl@itlboulder.com

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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 15 foot mounting height.



REPORT NUMBER: ITL80196

ISSUE DATE: 12/19/13

PAGE: 1 OF 8

PREPARED FOR: RAB LIGHTING, INC.

CATALOG NUMBER: ALED5T52 (TYPE V)

LUMINAIRE: CAST BROWN PAINTED METAL POST TOP FITTER WITH 3 FABRICATED BROWN PAINTED METAL VERTICAL POSTS, CAST 2-PIECE BROWN PAINTED FINNED METAL HOUSING, 4 CAST METAL HEAT SINKS/CIRCUIT BOARD MOUNTING BRACKETS, 4 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: FOUR WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDs), AIMED 5-DEGREES BELOW THE HORIZON.

TOTAL INPUT WATTS = 59.3 AT 120.0 VOLTS

LED DRIVERS: TWO RAB RDF25U7-02

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

TEST PROCEDURE: IESNA LM-79-08

TEST DISTANCE = 35.0 FEET

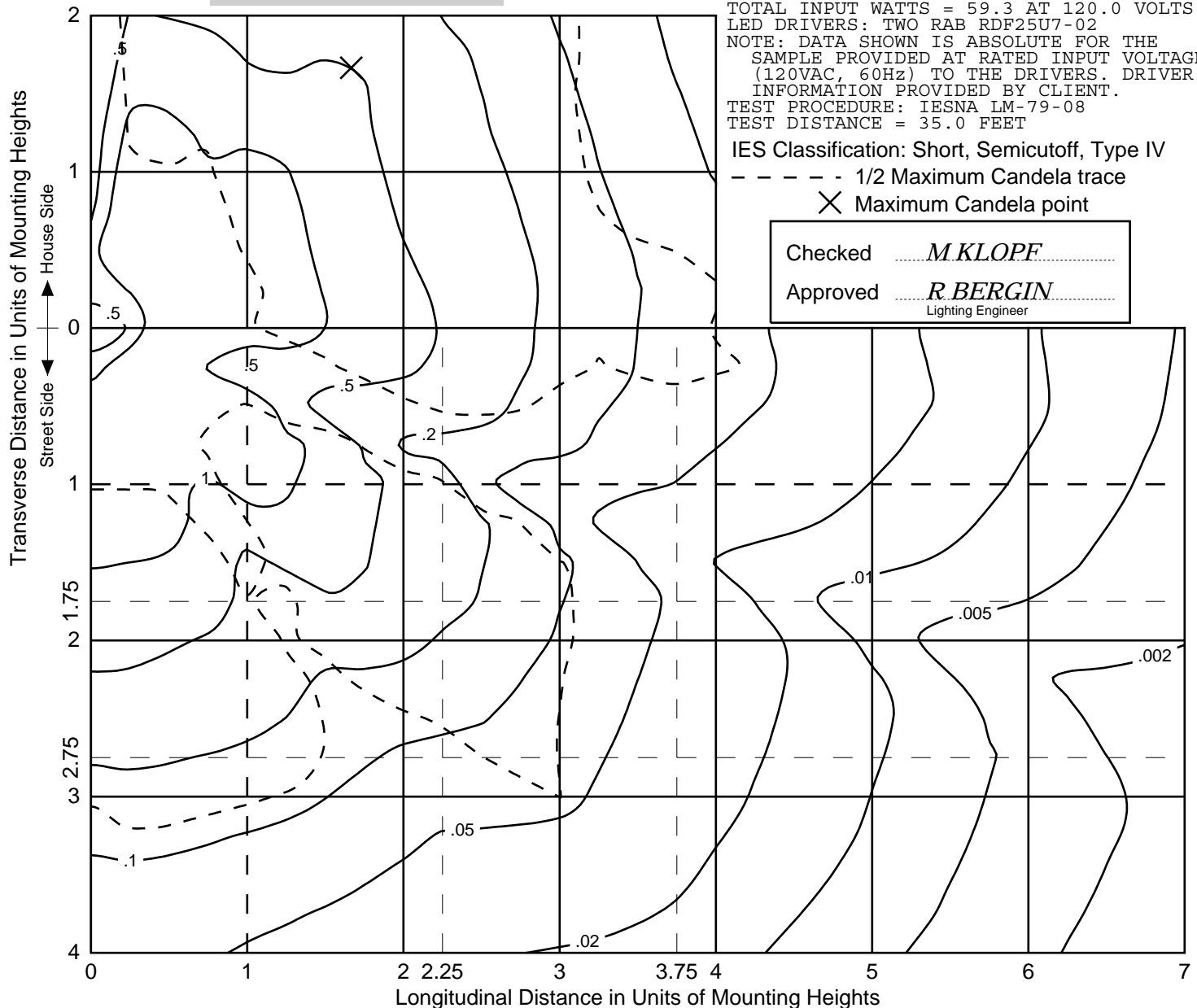
IES Classification: Short, Semicutoff, Type IV

--- 1/2 Maximum Candela trace

X Maximum Candela point

Checked M. KLOPF

Approved R. BERGIN
Lighting Engineer



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CATALOG NUMBER: ALED5T52 (TYPE V)

LUMINAIRE: CAST BROWN PAINTED METAL POST
TOP FITTER WITH 3 FABRICATED BROWN
PAINTED METAL VERTICAL POSTS, CAST 2-
PIECE BROWN PAINTED FINNED METAL
HOUSING, 4 CAST METAL HEAT
SINKS/CIRCUIT BOARD MOUNTING BRACKETS,
4 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: FOUR WHITE MULTI-CHIP LIGHT
EMITTING DIODES (LEDs), AIMED 5-
DEGREES BELOW THE HORIZON.

TOTAL INPUT WATTS = 59.3 AT 120.0 VOLTS

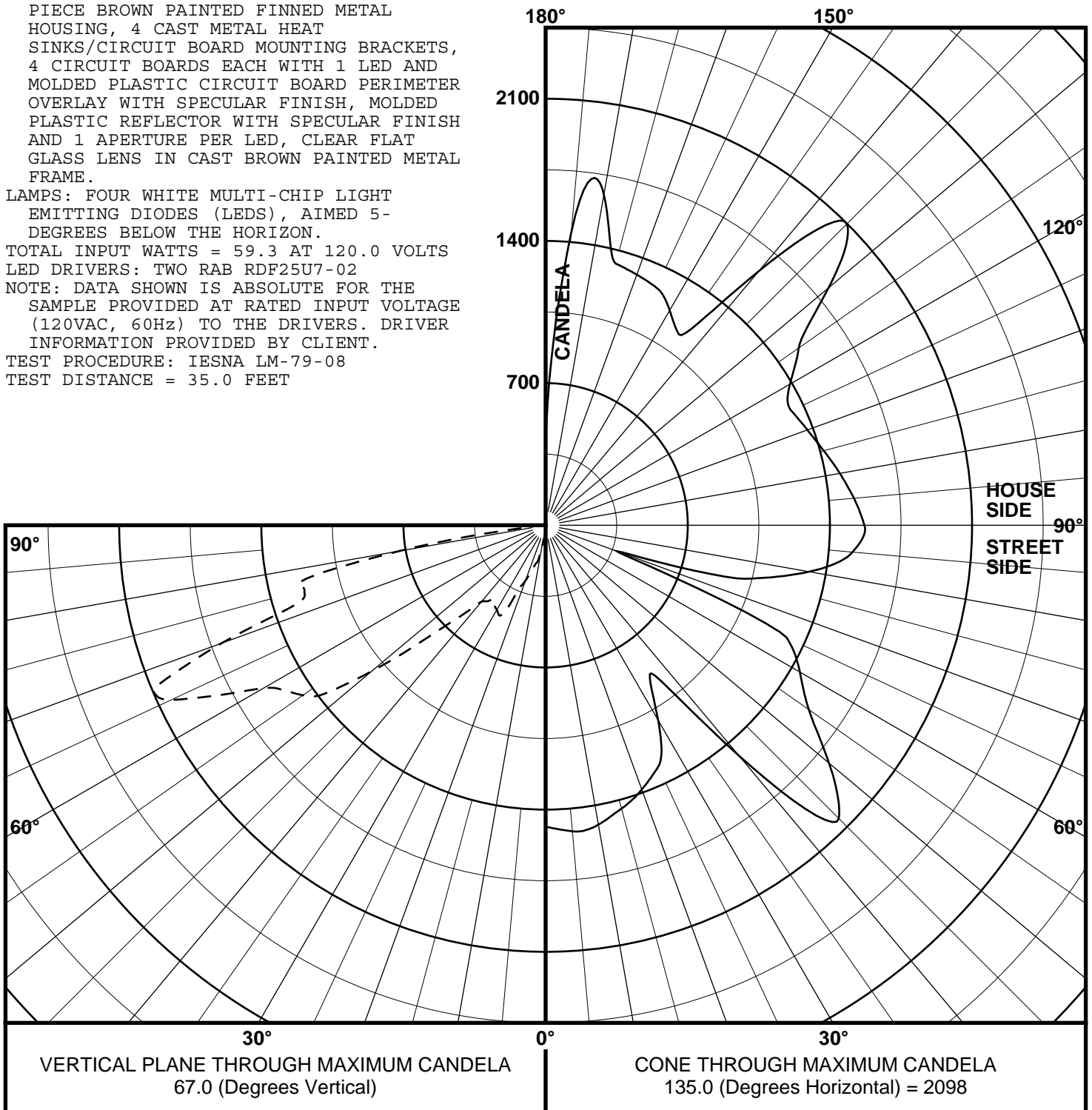
LED DRIVERS: TWO RAB RDF25U7-02

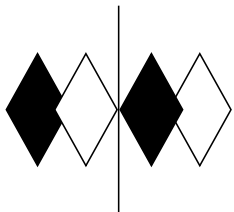
NOTE: DATA SHOWN IS ABSOLUTE FOR THE
SAMPLE PROVIDED AT RATED INPUT VOLTAGE
(120VAC, 60Hz) TO THE DRIVERS. DRIVER
INFORMATION PROVIDED BY CLIENT.

TEST PROCEDURE: IESNA LM-79-08

TEST DISTANCE = 35.0 FEET

MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

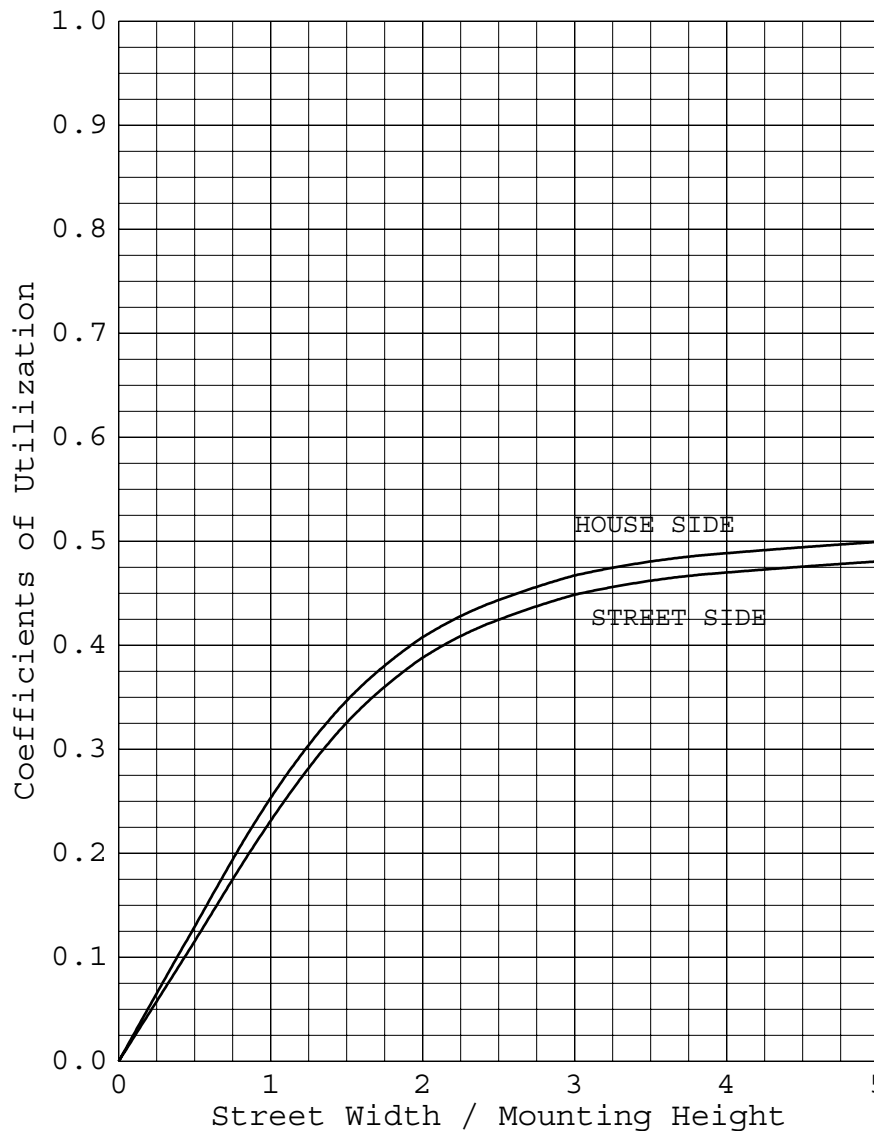




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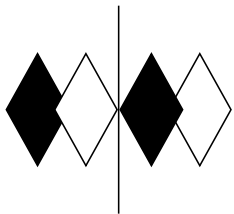
COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	2385	48.9
DOWNWARD HOUSE SIDE	2481	50.9
DOWNWARD TOTAL	4866	99.8
UPWARD STREET SIDE	5	0.1
UPWARD HOUSE SIDE	5	0.1
UPWARD TOTAL	10	0.2
TOTAL FLUX	4877	100.0

EFFICACY = 82.2 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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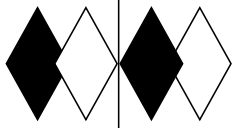
FLUX DISTRIBUTION BY SOLID ANGLE

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

	LUMENS	PERCENT OF FIXTURE	BUG ZONE RATINGS
FORWARD LIGHT	2385.	48.9	
FL (0- 30)	138.8	2.8	
FM (30- 60)	1054.8	21.6	
FH (60- 80)	1127.5	23.1	G1
FVH(80- 90)	63.8	1.3	G1
BACK LIGHT	2481.	50.9	
BL (0- 30)	130.7	2.7	B1
BM (30- 60)	1083.8	22.2	B2
BH (60- 80)	1186.1	24.3	B3 G1
BVH(80- 90)	80.5	1.7	G1
UPLIGHT	10.	0.2	
UL (90-100)	5.7	0.1	U1
UH (100-180)	4.8	0.1	U1
TRAPPED LIGHT	0.	0.0	
TOTAL FLUX	4877.	100.0	

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

BUG RATING: B3 U1 G1



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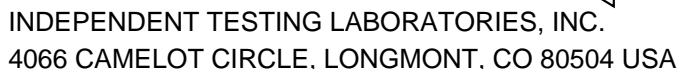
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CANDELA TABULATION

	STREET SIDE					LATERAL ANGLE						
	0.0	5.0	15.0	25.0	35.0	45.0	55.0	65.0	70.0	75.0	85.0	
	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	1.	1.	1.	1.	1.	0.	1.	1.	1.	1.	1.
	105.0	3.	3.	3.	3.	2.	5.	5.	5.	5.	5.	2.
	95.0	5.	5.	6.	5.	3.	6.	6.	6.	6.	6.	4.
	92.5	6.	6.	6.	6.	4.	6.	6.	6.	6.	6.	4.
	90.0	8.	8.	7.	6.	4.	5.	5.	5.	6.	6.	4.
	87.5	14.	13.	10.	8.	7.	9.	8.	7.	7.	8.	12.
	85.0	77.	45.	30.	23.	29.	31.	27.	21.	21.	23.	35.
V	82.5	241.	263.	189.	156.	119.	150.	157.	152.	68.	179.	237.
E	80.0	748.	762.	505.	452.	400.	530.	538.	435.	175.	415.	678.
R	77.5	974.	980.	722.	649.	629.	1011.	829.	674.	305.	592.	1041.
T	75.0	938.	977.	871.	842.	779.	1142.	1044.	904.	340.	738.	1093.
I	72.5	996.	1052.	1057.	1079.	943.	1164.	1378.	1094.	357.	855.	1025.
C	70.0	1194.	1257.	1252.	1228.	958.	1517.	1549.	1211.	378.	959.	1225.
A	67.5	1409.	1447.	1402.	1293.	910.	1986.	1576.	1292.	367.	1008.	1474.
L	67.0<<	1484.	1513.	1444.	1312.	895.	2042.	1582.	1310.	375.	1018.	1517.
	65.0	1649.	1636.	1457.	1357.	818.	2070.	1610.	1338.	381.	926.	1605.
A	62.5	1569.	1577.	1403.	1375.	756.	1905.	1661.	1348.	389.	789.	1560.
N	60.0	1480.	1485.	1377.	1379.	724.	1679.	1656.	1348.	424.	649.	1438.
G	57.5	1395.	1401.	1340.	1373.	695.	1553.	1584.	1350.	466.	530.	1357.
L	55.0	1333.	1337.	1301.	1334.	660.	1508.	1459.	1306.	497.	437.	1298.
E	52.5	1274.	1280.	1262.	1249.	652.	1452.	1348.	1239.	529.	351.	1261.
	50.0	1220.	1222.	1187.	1114.	703.	1338.	1254.	1148.	557.	285.	1199.
	47.5	1130.	1130.	1084.	936.	745.	1191.	1163.	1037.	563.	226.	1108.
	45.0	1017.	1014.	972.	735.	746.	1047.	1064.	945.	554.	199.	998.
	42.5	903.	900.	885.	576.	747.	944.	947.	890.	554.	193.	889.
	40.0	795.	798.	821.	445.	753.	829.	855.	807.	545.	197.	834.
	37.5	747.	765.	758.	326.	734.	766.	791.	728.	536.	213.	815.
	35.0	631.	671.	685.	307.	664.	739.	740.	676.	513.	221.	757.
	30.0	541.	555.	542.	365.	664.	636.	700.	640.	541.	283.	672.
	25.0	494.	483.	301.	361.	511.	549.	521.	529.	496.	282.	479.
	20.0	251.	257.	249.	263.	358.	410.	388.	381.	301.	220.	214.
	15.0	195.	192.	199.	220.	258.	227.	250.	207.	186.	161.	138.
	10.0	99.	94.	104.	104.	109.	105.	106.	111.	100.	93.	88.
	5.0	53.	54.	54.	54.	55.	58.	58.	52.	49.	49.	50.
	0.0	40.	40.	40.	40.	40.	40.	40.	40.	40.	40.	40.

CONE OF MAXIMUM CANDELA



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	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	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	1.	1.	1.	1.	1.	1.	1.	0.	1.	1.	1.
	105.0	4.	4.	3.	3.	3.	3.	4.	2.	5.	5.	5.
	95.0	4.	6.	5.	4.	4.	5.	6.	4.	6.	6.	6.
	92.5	4.	6.	6.	5.	6.	6.	6.	4.	6.	6.	6.
	90.0	4.	6.	6.	6.	8.	7.	6.	4.	6.	5.	5.
	87.5	12.	15.	12.	12.	15.	20.	14.	9.	9.	14.	14.
	85.0	45.	42.	45.	38.	53.	58.	49.	35.	30.	59.	50.
V	82.5	301.	285.	260.	204.	195.	243.	211.	218.	228.	351.	140.
E	80.0	606.	676.	553.	500.	589.	730.	558.	491.	474.	848.	344.
R	77.5	961.	999.	718.	706.	847.	1202.	741.	665.	584.	991.	440.
T	75.0	1093.	1110.	900.	936.	1067.	1229.	889.	880.	729.	877.	399.
I	72.5	1070.	1133.	1096.	1137.	1337.	1281.	1130.	1099.	925.	1057.	405.
C	70.0	1257.	1300.	1270.	1228.	1464.	1698.	1198.	1199.	1121.	1171.	314.
A	67.5	1494.	1477.	1386.	1309.	1509.	2079.	1158.	1273.	1310.	1402.	385.
L	67.0<<	1570.	1524.	1418.	1335.	1522.	2098.	1146.	1291.	1334.	1443.	408.
	65.0	1631.	1537.	1379.	1362.	1578.	2035.	1131.	1319.	1322.	1385.	250.
A	62.5	1546.	1494.	1362.	1376.	1620.	1810.	1128.	1328.	1303.	1326.	179.
N	60.0	1413.	1427.	1342.	1372.	1597.	1603.	1111.	1309.	1285.	1221.	161.
G	57.5	1341.	1357.	1297.	1362.	1531.	1517.	1074.	1287.	1257.	1133.	174.
L	55.0	1281.	1295.	1253.	1308.	1398.	1459.	1002.	1254.	1243.	1048.	164.
E	52.5	1248.	1247.	1192.	1221.	1297.	1352.	945.	1196.	1201.	999.	175.
	50.0	1185.	1171.	1113.	1133.	1220.	1120.	899.	1097.	1123.	912.	180.
	47.5	1085.	1077.	1014.	1040.	1142.	889.	924.	996.	1025.	809.	167.
	45.0	974.	969.	918.	959.	1038.	705.	872.	922.	934.	703.	158.
	42.5	870.	865.	842.	877.	906.	586.	803.	874.	861.	591.	131.
	40.0	827.	817.	790.	749.	791.	491.	762.	795.	818.	544.	141.
	37.5	802.	791.	714.	603.	706.	472.	717.	723.	728.	517.	170.
	35.0	750.	762.	626.	535.	535.	444.	681.	697.	678.	499.	223.
	30.0	687.	654.	502.	419.	269.	481.	650.	667.	648.	435.	261.
	25.0	530.	492.	430.	238.	162.	463.	510.	521.	544.	366.	248.
	20.0	257.	255.	295.	217.	253.	290.	344.	396.	445.	309.	236.
	15.0	143.	154.	183.	211.	283.	200.	199.	221.	217.	193.	182.
	10.0	90.	87.	89.	101.	98.	118.	101.	107.	96.	89.	90.
	5.0	49.	49.	52.	57.	53.	48.	46.	42.	45.	48.	48.
	0.0	40.	40.	40.	40.	40.	40.	40.	40.	40.	40.	40.

THIS REPORT IS BASED ON PUBLISHED INDUSTRY PROCEDURES. FIELD PERFORMANCE MAY DIFFER FROM LABORATORY PERFORMANCE.



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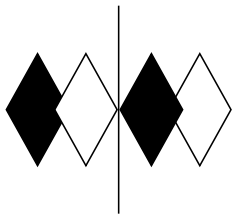
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5-DEGREE
ZONAL LUMEN SUMMARY

0- 5	1
5- 10	5
10- 15	19
15- 20	42
20- 25	78
25- 30	124
30- 35	170
35- 40	219
40- 45	291
45- 50	389
50- 55	491
55- 60	578
60- 65	660
65- 70	683
70- 75	563
75- 80	408
80- 85	135
85- 90	9
90- 95	3
95-100	3
100-105	2
105-110	2
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	6
0- 20	67
0- 30	269
0- 40	659
0- 50	1339
0- 60	2408
0- 70	3751
0- 80	4722
0- 90	4866
0-100	4872
0-110	4875
0-120	4876
0-130	4877
0-140	4877
0-150	4877
0-160	4877
0-170	4877
0-180	4877



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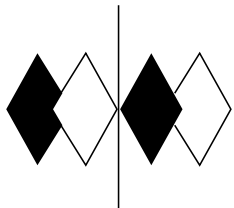
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ADDRESS: 170 LUDLOW AVE
NORTHVALE, NJ 07647

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REPORT NUMBER: ITL80199
DATE: 12/24/13
PREPARED FOR: RAB LIGHTING, INC.
CATALOG NUMBER: ALED5T52 (TYPE V)

ADDRESS: 170 LUDLOW AVE
NORTHVALE, NJ 07647

LUMINAIRE: CAST BROWN PAINTED METAL POST TOP FITTER WITH 3 FABRICATED BROWN PAINTED METAL VERTICAL POSTS, CAST 2-PIECE BROWN PAINTED FINNED METAL HOUSING, 4 CAST METAL HEAT SINKS/CIRCUIT BOARD MOUNTING BRACKETS, 4 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: FOUR WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDs), AIMED 5-DEGREES BELOW THE HORIZON.

DRIVERS: TWO RAB RDF25U7-02

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

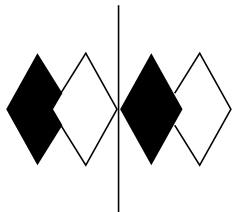
PROCEDURE: The test sample was provided by the customer and had an unknown number of operating hours. The test sample was mounted inside the integrating sphere and allowed to stabilize. After stabilization occurred, measurements were taken. In order to measure mean performance, multiple data sets were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

THIS ITL 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.

Checked	<i>N THOMAS</i>
Approved	<i>P O'CONNOR</i>
	SPHERE LAB SUPERVISOR



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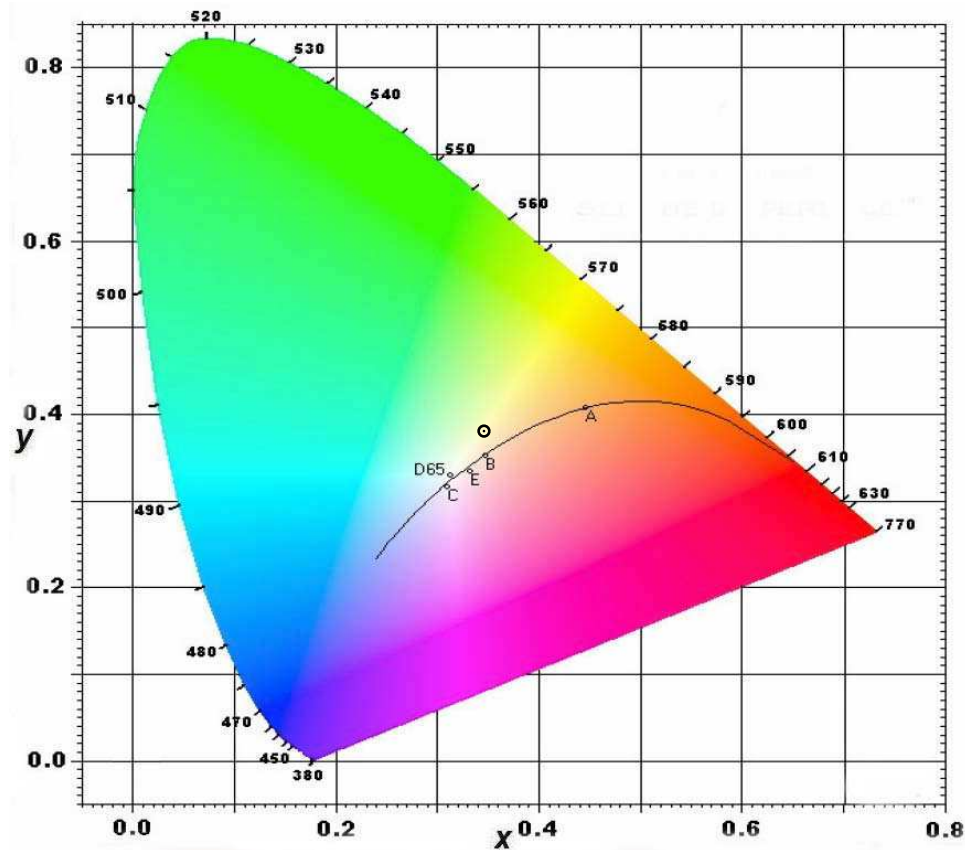
NVLAP LAB CODE: 200925-0

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CIE Chromaticity Diagram





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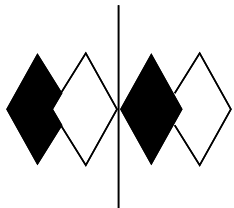
RESULTS:

SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3457
Chromaticity Ordinate y	0.3802
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2013
Chromaticity Ordinate v'	0.4980
Correlated Color Temp CCT (K)	5063
ANSI C78.377-2008 Duv	0.013
Total Radiant Flux (milliWatts)	13733 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.496
Input Power (Watts)	59.2
Input Power Factor (%)	99.5
Input Current THD (%)	7.9
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)	0.235
Input Power (Watts)	59.0
Input Power Factor (%)	90.6
Input Current THD (%)	11.3
Input Voltage THD (%)	0.1

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	64
R1 Light greyish red	59
R2 Dark greyish yellow	68
R3 Strong yellowish green	75
R4 Moderate yellowish green	65
R5 Light bluish green	61
R6 Light blue	57
R7 Light violet	77
R8 Light reddish purple	49
R9 Strong red	-59
R10 Strong yellow	25
R11 Strong green	61
R12 Strong blue	30
R13 Light yellowish pink (skin)	60
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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RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.391	515	55.198	650	26.631
385	0.433	520	65.074	655	23.844
390	0.519	525	72.798	660	21.268
395	0.709	530	78.347	665	18.917
400	1.076	535	81.899	670	16.765
405	1.846	540	84.107	675	14.837
410	3.486	545	85.193	680	13.110
415	6.807	550	85.555	685	11.563
420	13.069	555	85.233	690	10.171
425	23.628	560	84.566	695	8.947
430	39.045	565	83.563	700	7.856
435	60.384	570	81.875	705	6.901
440	91.203	575	79.942	710	6.049
445	115.639	580	77.566	715	5.287
450	98.331	585	74.777	720	4.636
455	59.610	590	71.571	725	4.048
460	36.727	595	68.071	730	3.532
465	23.905	600	64.328	735	3.086
470	15.048	605	60.427	740	2.701
475	10.450	610	56.403	745	2.373
480	8.594	615	52.227	750	2.082
485	8.386	620	48.119	755	1.821
490	10.210	625	44.077	760	1.598
495	14.744	630	40.163	765	1.402
500	22.264	635	36.465	770	1.229
505	32.316	640	33.009	775	1.079
510	43.837	645	29.708	780	0.951

