RAB LIGHTING

NVLAP LAB CODE: 201058-0

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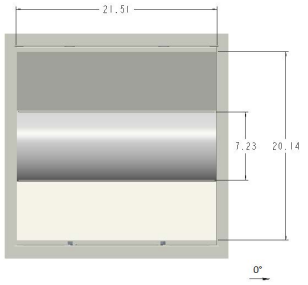
REPORT NUMBER: RAB03241 PAGE: 1 OF 8
ISSUE DATE: 04/25/17 DATE SAMPLE TESTED: 04/25/17
CATALOG NUMBER: RTLED2X2-29YNW/D10
LUMINAIRE: WHITE PAINTED SHEET METAL HOUSING, 2 WHITE CIRCUIT BOARDS EACH WITH 60 LEDS, MATTE WHITE POLYCARBONATE LENS IN THE CENTER, ROUGH SURFACE FACING OUT.FIXTURE WAS MOUNTED IN Lithonia Lighting Model #2GT8 2 U316 A12 MVOLT GEB10IS HOUSING.
LAMPS: ONE HUNDRED AND TWENTY WHITE LIGHT EMITTING DIODES (LEDS), VERTICAL BASE-UP POSITION.
(SEE PAGE 2 FOR MORE INFORMATION)

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0	FLUX
0	1217	1217	1217	1217	1217	
5	1211	1209	1212	1214	1215	115
15	1159	1161	1167	1175	1176	330
25	1065	1069	1080	1096	1098	499
35	933	941	959	982	990	601
45	773	784	810	842	854	627
55	595	610	645	689	707	581
65	410	432	477	519	535	471
75	231	256	296	349	374	317
85	64	87	114	126	125	113
90	0	1	0	0	0	



ZONAL LUMEN SUMMARY

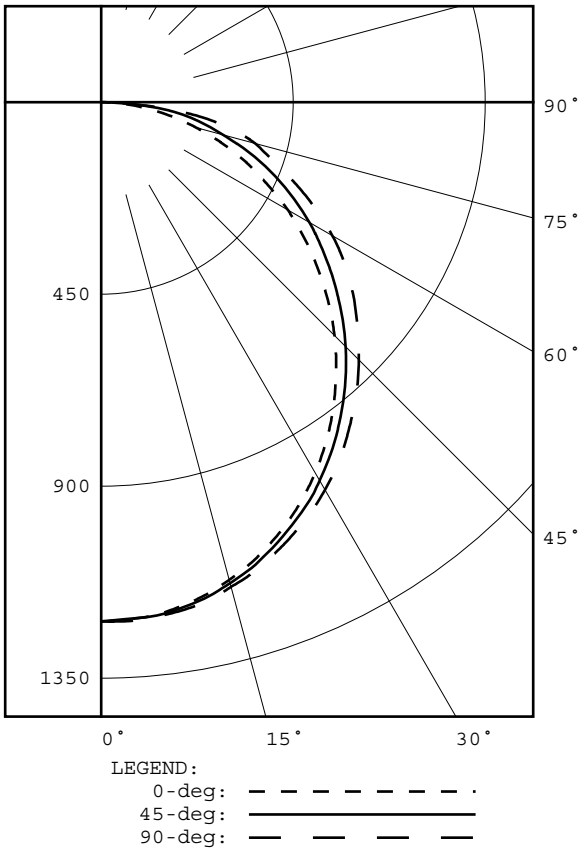
ZONE	LUMENS	%FIXT
0- 30	943	25.8
0- 40	1544	42.3
0- 60	2752	75.3
0- 90	3653	100.0
90-180	0	0.0
0-180	3653	100.0

TOTAL INPUT WATTS = 29.4
EFFICACY = 124.3 Lm/W
CIE TYPE - DIRECT

PLANE	: 0-DEG	90-DEG
SPACING CRITERIA	: 1.2	1.3
PLANE	: 0-DEG	90-DEG
LUMINOUS LENGTH	:21.510	20.140

LUMINANCE DATA IN CANDELA/SQ METER

ANGLE IN DEG	AVERAGE 0-DEG	AVERAGE 45-DEG	AVERAGE 90-DEG
45	3910.	4097.	4320.
55	3710.	4022.	4409.
65	3470.	4037.	4528.
75	3192.	4090.	5168.
85	2626.	4678.	5130.



Checked P.ALBERS

Approved D.WANG-MUNSON

REPORT NUMBER: RAB03241 PAGE: 2 OF 8
ISSUE DATE: 04/25/17 DATE SAMPLE TESTED: 04/25/17
CATALOG NUMBER: RTLED2X2-29YNW/D10

ADDITIONAL INFORMATION

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 = 29.373 W AT 277.0 VAC.
LED DRIVER: RDF25U7-32
TEST PROCEDURE: IESNA LM-79-08
LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE
AMBIENT: 24.0
ACCREDITED LABORATORY CODE 201058-0

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PLANE	:	0-DEG 90-DEG
BEAM ANGLE (50%)	:	108.4 X 121.9 DEGREES
FIELD ANGLE (10%)	:	162.8 X 170.2 DEGREES

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	1217	1217	1217	1217	1217
2.5	1214	1212	1213	1217	1218
5.0	1211	1209	1212	1214	1215
7.5	1203	1203	1206	1209	1210
10.0	1191	1192	1196	1202	1203
12.5	1177	1178	1184	1191	1193
15.0	1159	1161	1167	1175	1176
17.5	1140	1142	1150	1159	1161
20.0	1117	1120	1128	1139	1141
22.5	1092	1095	1105	1118	1121
25.0	1065	1069	1080	1096	1098
27.5	1035	1040	1055	1071	1075
30.0	1003	1008	1024	1044	1049
32.5	969	976	992	1014	1021
35.0	933	941	959	982	990
37.5	895	904	923	948	957
40.0	855	865	887	913	924
42.5	815	825	849	878	890
45.0	773	784	810	842	854
47.5	730	743	770	804	818
50.0	685	698	728	766	781
52.5	640	655	687	728	745
55.0	595	610	645	689	707
57.5	549	566	604	650	668
60.0	505	522	564	609	626
62.5	457	476	520	565	581
65.0	410	432	477	519	535
67.5	368	392	433	473	489
70.0	322	346	390	426	444
72.5	276	301	342	388	406
75.0	231	256	296	349	374
77.5	188	212	256	309	329
80.0	145	168	216	260	276
82.5	104	126	171	202	211
85.0	64	87	114	126	125
87.5	27	40	43	40	33
90.0	0	1	0	0	0

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ZONAL LUMEN SUMMARY

0- 5	29.
5- 10	86.
10- 15	140.
15- 20	189.
20- 25	232.
25- 30	267.
30- 35	293.
35- 40	308.
40- 45	315.
45- 50	312.
50- 55	300.
55- 60	280.
60- 65	253.
65- 70	218.
70- 75	179.
75- 80	138.
80- 85	88.
85- 90	25.

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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	29
5- 10	86
10- 15	140
15- 20	189
20- 25	232
25- 30	267
30- 35	293
35- 40	308
40- 45	315
45- 50	312
50- 55	300
55- 60	280
60- 65	253
65- 70	218
70- 75	179
75- 80	138
80- 85	88
85- 90	25
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	115
0- 20	445
0- 30	943
0- 40	1544
0- 50	2171
0- 60	2752
0- 70	3223
0- 80	3540
0- 90	3653
0-100	3653
0-110	3653
0-120	3653
0-130	3653
0-140	3653
0-150	3653
0-160	3653
0-170	3653
0-180	3653

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CATALOG NUMBER: RTLED2X2-29YNW/D10

COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

EFFECTIVE FLOOR CAVITY REFLECTANCE 0.20

RC	80				70				50			30			10			0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	108	103	98	94	105	100	96	92	96	93	89	92	89	87	89	86	84	82
2	98	89	82	76	95	87	80	75	83	78	73	80	75	71	77	73	70	67
3	89	78	69	62	86	76	68	62	73	66	61	70	64	60	68	63	59	56
4	81	69	60	53	79	67	59	52	65	57	51	62	56	51	60	55	50	48
5	74	61	52	45	72	60	51	45	58	50	44	56	49	44	54	48	43	41
6	69	55	46	39	67	54	45	39	52	44	39	51	44	38	49	43	38	36
7	64	50	41	35	62	49	41	34	47	40	34	46	39	34	45	38	34	32
8	59	45	37	31	58	45	36	31	43	36	30	42	35	30	41	35	30	28
9	55	42	33	28	54	41	33	28	40	33	27	39	32	27	38	32	27	25
10	52	38	30	25	51	38	30	25	37	30	25	36	29	25	35	29	25	23

ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES 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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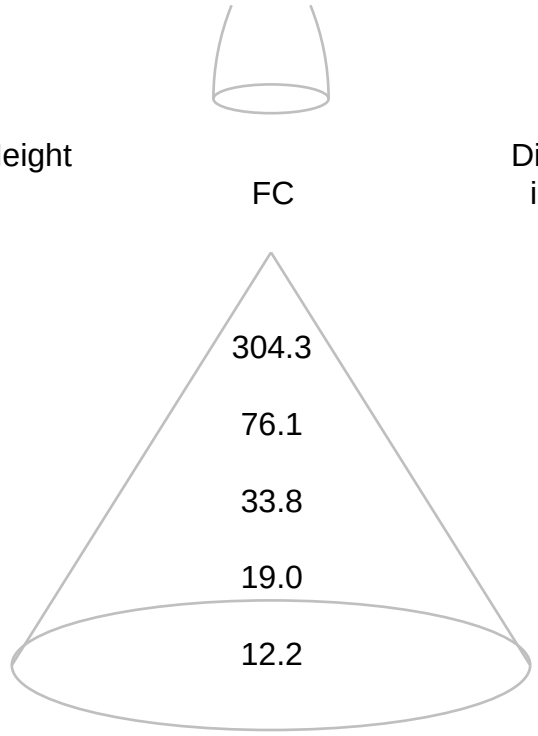
DATE SAMPLE TESTED: 04/25/17

CONE OF LIGHT DIAGRAM

(diameter shown is where fc value is half the fc at nadir)



Mounting Height in feet	FC	Diameter in feet
2.0	304.3	2.5
4.0	76.1	5.0
6.0	33.8	7.5
8.0	19.0	10.0
10.0	12.2	12.5

Note: The candela values used to generate this diagram were obtained by averaging the photometric data into a single plane.

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REPORT NUMBER: RAB03242
DATE: 4/24/2017
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: RTLED2X2-29YNW/D10

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: WHITE PAINTED SHEET METAL HOUSING, 2 WHITE CIRCUIT BOARDS EACH WITH 60 LEDS, MATTE WHITE POLYCARBONATE LENS IN THE CENTER, ROUGH SURFACE FACING OUT. FIXTURE WAS MOUNTED IN Lithonia Lighting Model #2GT8 2 U316 A12 MVOLT GEB10IS HOUSING.

LAMP: ONE HUNDRED AND TWENTY WHITE LIGHT EMITTING DIODES (LEDS), VERTICAL BASE-UP POSITION.

DRIVER: RDF25U7-32

OBJECT OF TEST: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT THE RATED INPUT VOLTAGES (277.0 AND 120.0 VAC, 60Hz) TO THE TEST SAMPLE.

INSTRUMENTS:	Calibration Due:
GWINSTEK PROGRAMMABLE AC POWER SOURCE APS-7100	N/A
CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202	3/01/18
OCEAN OPTICS QE65PRO Spectroradiometer	04/10/18
RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	04/10/18

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 (120.0 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 X.CAO

Approved D.WANG-MUNSON
Lighting Engineer

RAB LIGHTING

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RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	3653 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4079
Chromaticity Ordinate y	0.3929
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2365
Chromaticity Ordinate v'	0.5125
Correlated Color Temp CCT (K)	3462
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	11056 *
ELECTRICAL	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.114
Input Power (Watts)	29.4
Input Power Factor (%)	93.0
Input Current THD (%)	12.3
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	124.3
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.244
Input Power (Watts)	28.8
Input Power Factor (%)	98.3
Input Current THD (%)	17.8
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	84
R1 Light greyish red	82
R2 Dark greyish yellow	90
R3 Strong yellowish green	97
R4 Moderate yellowish green	84
R5 Light bluish green	83
R6 Light blue	88
R7 Light violet	85
R8 Light reddish purple	63
R9 Strong red	11
R10 Strong yellow	78
R11 Strong green	83
R12 Strong blue	71
R13 Light yellowish pink (skin)	84
R14 Moderate olive green (leaf)	98

*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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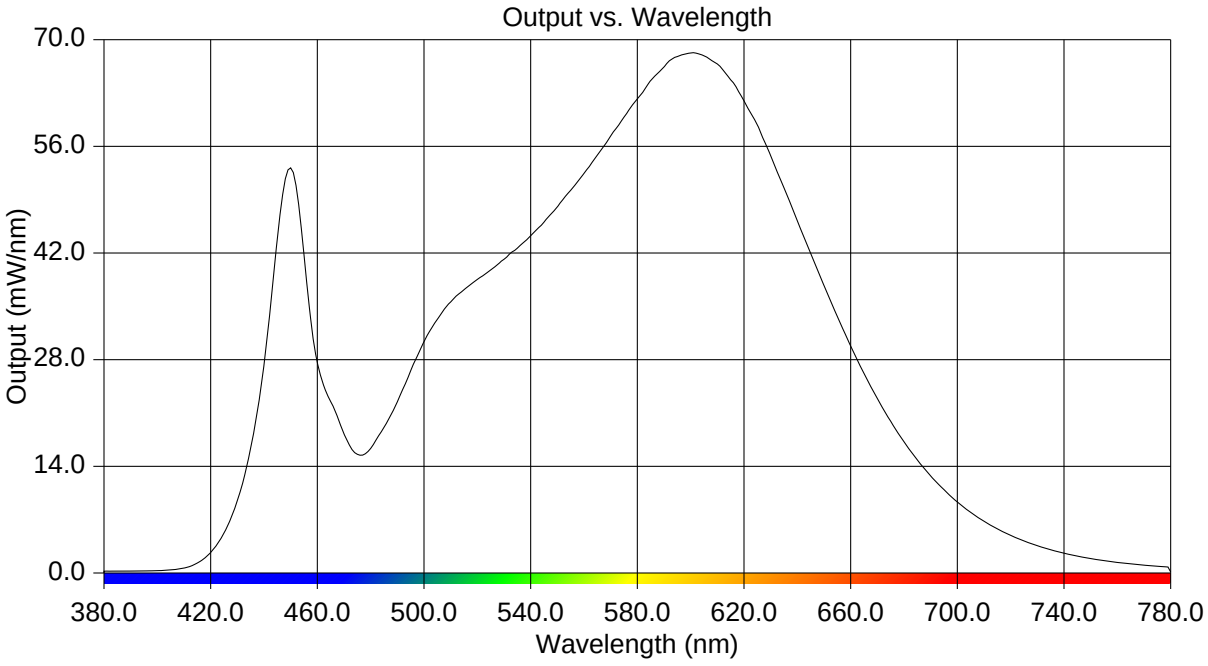
RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.236	515	37.156	650	37.754
385	0.245	520	38.532	655	33.668
390	0.262	525	39.798	660	29.782
395	0.264	530	41.173	665	26.179
400	0.304	535	42.633	670	22.887
405	0.402	540	44.277	675	19.926
410	0.652	545	46.050	680	17.205
415	1.311	550	48.077	685	14.869
420	2.690	555	50.226	690	12.705
425	5.234	560	52.463	695	10.943
430	9.513	565	54.831	700	9.329
435	16.389	570	57.359	705	7.966
440	27.418	575	59.834	710	6.773
445	43.850	580	62.256	715	5.787
450	53.174	585	64.620	720	4.933
455	41.770	590	66.418	725	4.203
460	27.597	595	67.782	730	3.579
465	22.499	600	68.249	735	3.047
470	18.278	605	67.886	740	2.596
475	15.579	610	66.810	745	2.215
480	16.346	615	64.730	750	1.899
485	19.095	620	61.968	755	1.625
490	22.463	625	58.859	760	1.389
495	26.543	630	54.772	765	1.190
500	30.372	635	50.549	770	1.021
505	33.325	640	46.224	775	0.883
510	35.570	645	41.922	780	0.132



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CIE Chromaticity Diagram