RAB LIGHTING

NVLAP LAB CODE: 201058-0

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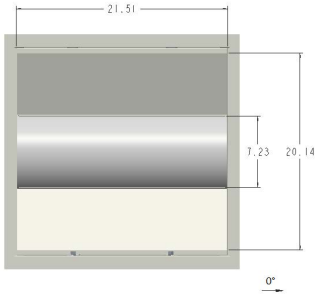
REPORT NUMBER: RAB03224 PAGE: 1 OF 8
ISSUE DATE: 04/20/17 DATE SAMPLE TESTED: 04/20/17
CATALOG NUMBER: RTLED2X2-19NWHC/D10
LUMINAIRE: WHITE PAINTED SHEET METAL HOUSING, 2 WHITE CIRCUIT BOARDS EACH WITH 40 LEDS, MATTE WHITE POLYCARBONATE LENS IN THE CENTER, ROUGH SURFACE FACING OUT.FIXTURE WAS MOUNTED IN Lithonia Lighting Model #2GT8 2 U316 A12 MVOLT GEB10IS HOUSING.
LAMPS: EIGHTY 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	684	684	684	684	684	
5	680	679	681	682	683	65
15	652	653	657	661	662	185
25	597	599	607	615	618	280
35	519	524	536	550	554	336
45	430	435	453	471	479	350
55	335	342	366	390	397	327
65	231	241	270	292	304	265
75	129	141	166	194	210	177
85	37	48	65	68	73	63
90	0	0	0	0	0	



ZONAL LUMEN SUMMARY

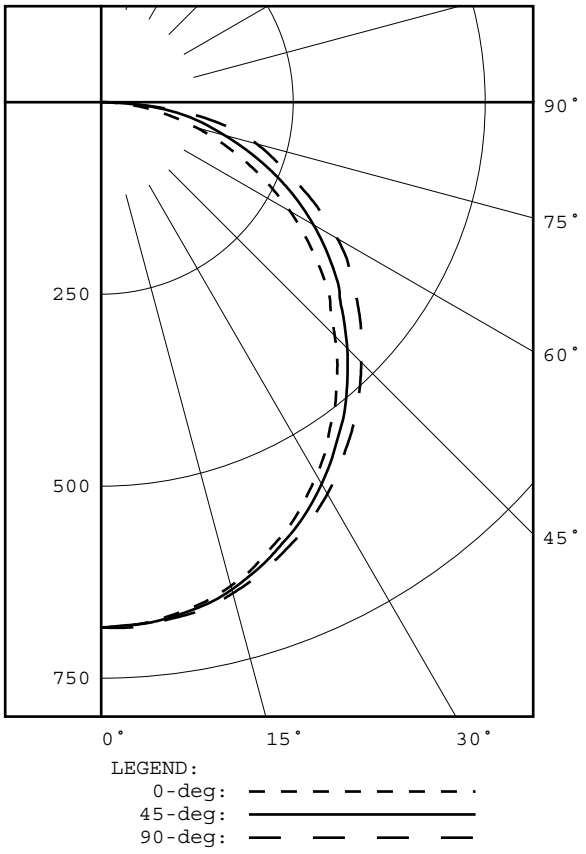
ZONE	LUMENS	%FIXT
0- 30	530	25.9
0- 40	866	42.3
0- 60	1543	75.4
0- 90	2048	100.0
90-180	0	0.0
0-180	2048	100.0

TOTAL INPUT WATTS = 19.3
EFFICACY = 106.1 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	2175.	2291.	2423.
55	2089.	2282.	2476.
65	1955.	2285.	2573.
75	1783.	2294.	2902.
85	1518.	2667.	2996.



Checked	*P.ALBERS*
Approved	*D.WANG-MUNSON*

REPORT NUMBER: RAB03224 PAGE: 2 OF 8
ISSUE DATE: 04/20/17 DATE SAMPLE TESTED: 04/20/17
CATALOG NUMBER: RTLED2X2-19NWHC/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 = 19.344 W AT 277.0 VAC.
LED DRIVER: RDF25U7-39
TEST PROCEDURE: IESNA LM-79-08
LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE
AMBIENT: 24.2
ACCREDITED LABORATORY CODE 201058-0

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PLANE	:	0-DEG 90-DEG
BEAM ANGLE (50%)	:	108.6 X 122.4 DEGREES
FIELD ANGLE (10%)	:	162.8 X 170.4 DEGREES

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	684	684	684	684	684
2.5	683	681	682	685	685
5.0	680	679	681	682	683
7.5	675	675	677	678	679
10.0	669	669	672	675	676
12.5	662	663	666	670	671
15.0	652	653	657	661	662
17.5	641	641	646	651	653
20.0	626	628	634	640	642
22.5	612	614	620	628	630
25.0	597	599	607	615	618
27.5	579	582	591	601	604
30.0	561	565	574	585	589
32.5	542	546	556	569	573
35.0	519	524	536	550	554
37.5	500	504	518	532	537
40.0	477	482	497	512	518
42.5	455	460	475	492	499
45.0	430	435	453	471	479
47.5	406	411	430	450	460
50.0	387	392	407	428	440
52.5	361	367	389	407	419
55.0	335	342	366	390	397
57.5	310	317	343	367	379
60.0	284	292	319	343	355
62.5	257	267	295	318	329
65.0	231	241	270	292	304
67.5	205	216	244	265	277
70.0	179	191	218	239	252
72.5	154	166	192	216	231
75.0	129	141	166	194	210
77.5	105	117	143	171	185
80.0	81	92	121	143	155
82.5	59	70	95	110	119
85.0	37	48	65	68	73
87.5	16	22	25	21	22
90.0	0	0	0	0	0

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ZONAL LUMEN SUMMARY

0- 5	16.
5- 10	48.
10- 15	79.
15- 20	106.
20- 25	130.
25- 30	150.
30- 35	164.
35- 40	173.
40- 45	176.
45- 50	174.
50- 55	169.
55- 60	158.
60- 65	142.
65- 70	122.
70- 75	100.
75- 80	77.
80- 85	49.
85- 90	14.

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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	16
5- 10	48
10- 15	79
15- 20	106
20- 25	130
25- 30	150
30- 35	164
35- 40	173
40- 45	176
45- 50	174
50- 55	169
55- 60	158
60- 65	142
65- 70	122
70- 75	100
75- 80	77
80- 85	49
85- 90	14
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	65
0- 20	250
0- 30	530
0- 40	866
0- 50	1216
0- 60	1543
0- 70	1808
0- 80	1985
0- 90	2048
0-100	2048
0-110	2048
0-120	2048
0-130	2048
0-140	2048
0-150	2048
0-160	2048
0-170	2048
0-180	2048

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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	75	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	31	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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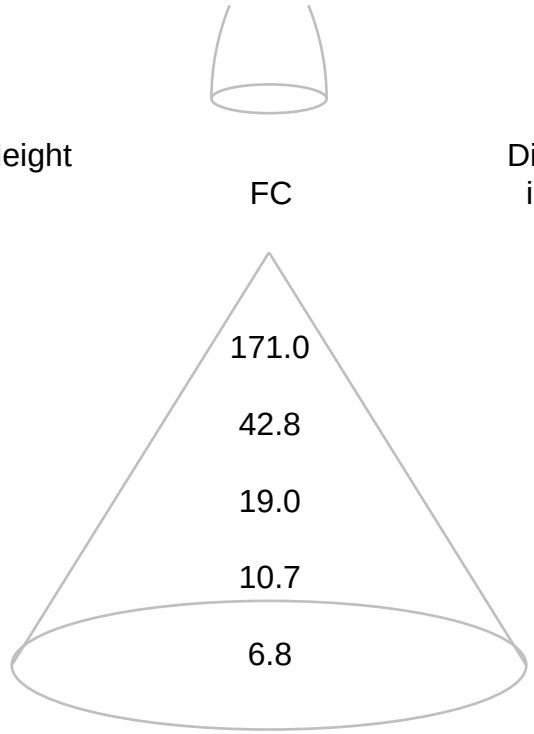
CONE OF LIGHT DIAGRAM

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



Mounting Height in feet	FC	Diameter in feet
2.0	171.0	2.5
4.0	42.8	5.0
6.0	19.0	7.5
8.0	10.7	10.0
10.0	6.8	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: RAB03225
DATE: 4/21/2017
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: RTLED2X2-19NWHC/D10

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: WHITE PAINTED SHEET METAL HOUSING, 2 WHITE CIRCUIT BOARDS EACH WITH 40 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: EIGHTY WHITE LIGHT EMITTING DIODES (LEDS), VERTICAL BASE-UP POSITION.

DRIVER: RDF25U7-39

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)	2048 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3749
Chromaticity Ordinate y	0.3699
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2242
Chromaticity Ordinate v'	0.4977
Correlated Color Temp CCT (K)	4104
ANSI C78.377-2008 Duv	-0.002
Total Radiant Flux (milliWatts)	7299 *
ELECTRICAL	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.079
Input Power (Watts)	19.3
Input Power Factor (%)	88.8
Input Current THD (%)	13.7
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	106.1
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.157
Input Power (Watts)	18.6
Input Power Factor (%)	98.8
Input Current THD (%)	11.1
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	94
R1 Light greyish red	96
R2 Dark greyish yellow	94
R3 Strong yellowish green	90
R4 Moderate yellowish green	94
R5 Light bluish green	94
R6 Light blue	90
R7 Light violet	95
R8 Light reddish purple	95
R9 Strong red	86
R10 Strong yellow	85
R11 Strong green	93
R12 Strong blue	73
R13 Light yellowish pink (skin)	95
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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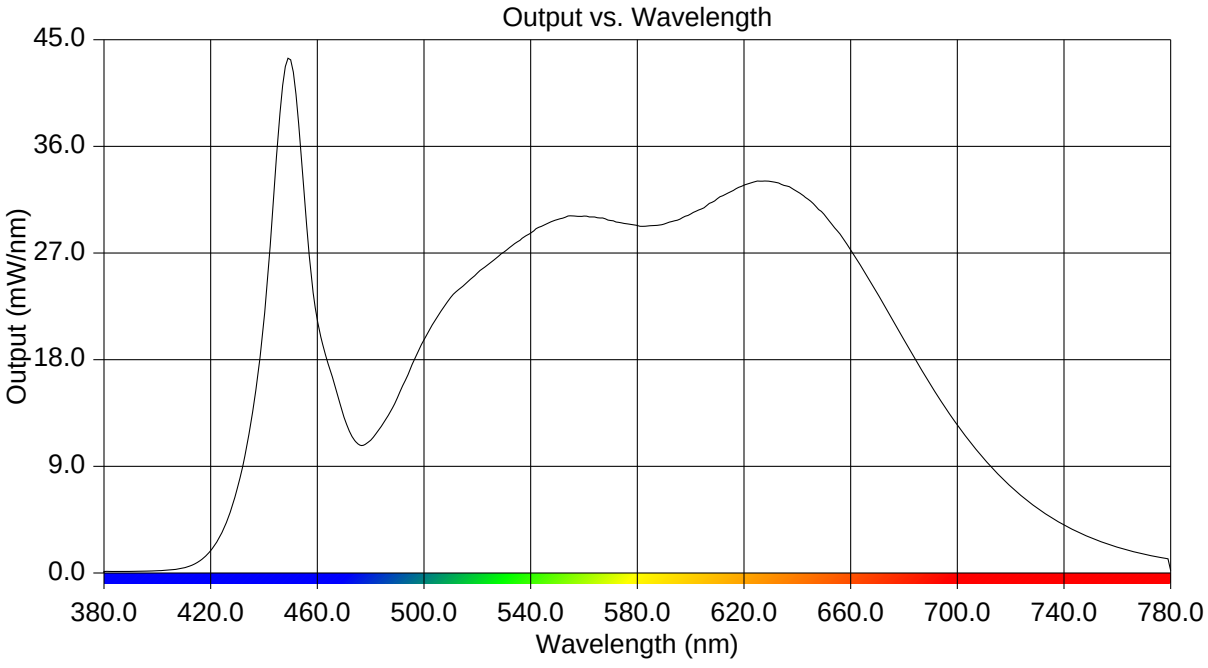
RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.125	515	24.281	650	30.270
385	0.134	520	25.306	655	28.870
390	0.134	525	26.209	660	27.264
395	0.152	530	27.081	665	25.447
400	0.189	535	27.939	670	23.584
405	0.260	540	28.666	675	21.673
410	0.435	545	29.349	680	19.674
415	0.889	550	29.819	685	17.758
420	1.868	555	30.138	690	15.879
425	3.783	560	30.116	695	14.122
430	7.155	565	29.975	700	12.477
435	12.523	570	29.741	705	10.986
440	21.417	575	29.495	710	9.634
445	35.960	580	29.320	715	8.409
450	43.301	585	29.294	720	7.306
455	32.213	590	29.439	725	6.329
460	21.315	595	29.767	730	5.462
465	16.958	600	30.289	735	4.711
470	13.145	605	30.813	740	4.040
475	10.939	610	31.582	745	3.483
480	11.199	615	32.168	750	2.987
485	12.707	620	32.724	755	2.556
490	14.771	625	33.072	760	2.181
495	17.262	630	33.041	765	1.866
500	19.703	635	32.703	770	1.593
505	21.641	640	32.160	775	1.363
510	23.249	645	31.370	780	0.202



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CIE Chromaticity Diagram