RAB LIGHTING

NVLAP LAB CODE: 201058-0

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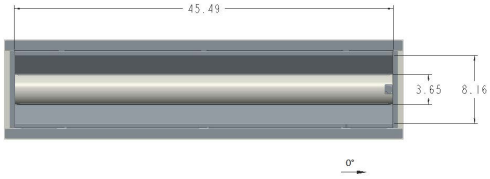
REPORT NUMBER: RAB03313 PAGE: 1 OF 8
ISSUE DATE: 05/10/17 DATE SAMPLE TESTED: 05/10/17
CATALOG NUMBER: RTLED1X4-19YNW/D10
LUMINAIRE: WHITE PAINTED SHEET METAL HOUSING, 2 WHITE CIRCUIT BOARDS EACH WITH 40 LEDS, MATTE WHITE POLYCARBONATE LENS IN THE CENTER, ROUGH SURFACE FACING OUT. FIXTURE WAS MOUNTED IN FLECO TXF131A232MV UL E43814 HOUSING.
LAMPS: EIGHTY 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	849	849	849	849	849	
5	834	838	850	854	853	80
15	800	806	821	828	830	231
25	732	740	762	775	781	350
35	637	649	680	699	709	422
45	522	540	575	597	606	439
55	400	421	452	477	490	402
65	275	298	330	367	383	328
75	151	169	218	246	259	221
85	44	65	79	75	76	77
90	4	4	2	1	1	



ZONAL LUMEN SUMMARY

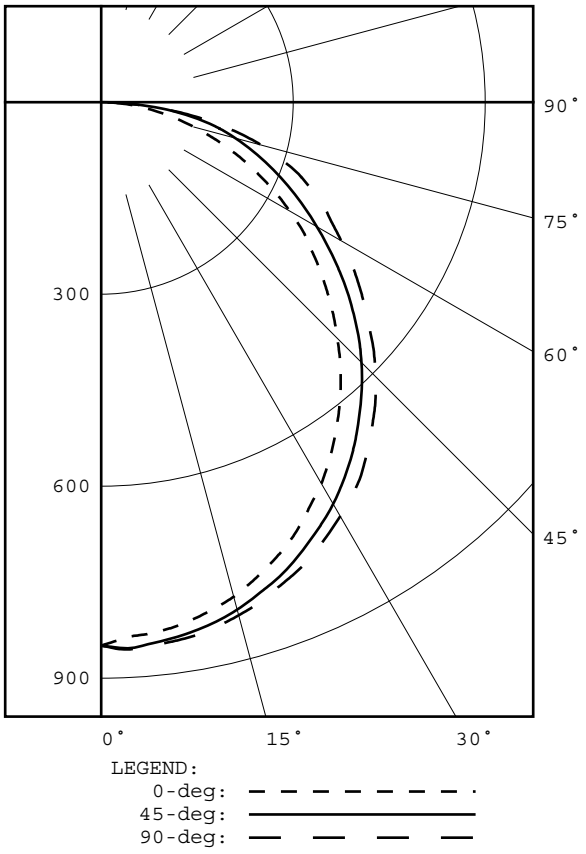
ZONE	LUMENS	%FIXT
0- 30	661	25.9
0- 40	1083	42.5
0- 60	1923	75.5
0- 90	2548	100.0
90-180	0	0.0
0-180	2548	100.0

TOTAL INPUT WATTS = 19.3
EFFICACY = 132.0 Lm/W
CIE TYPE - DIRECT

PLANE	: 0-DEG	90-DEG
SPACING CRITERIA	: 1.2	1.3
PLANE	: 0-DEG	90-DEG
LUMINOUS LENGTH	:45.490	8.160

LUMINANCE DATA IN CANDELA/SQ METER

ANGLE IN DEG	AVERAGE 0-DEG	AVERAGE 45-DEG	AVERAGE 90-DEG
45	3081.	3394.	3577.
55	2911.	3289.	3566.
65	2716.	3259.	3783.
75	2435.	3516.	4177.
85	2107.	3784.	3640.



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

REPORT NUMBER: RAB03313 PAGE: 2 OF 8
ISSUE DATE: 05/10/17 DATE SAMPLE TESTED: 05/10/17
CATALOG NUMBER: RTLED1X4-19YNW/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 = 19.274 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

REPORT NUMBER: RAB03313 PAGE: 3 OF 8
ISSUE DATE: 05/10/17 DATE SAMPLE TESTED: 05/10/17
CATALOG NUMBER: RTLED1X4-19YNW/D10

PLANE	:	0-DEG 90-DEG
BEAM ANGLE (50%)	:	105.4 X 120.8 DEGREES
FIELD ANGLE (10%)	:	161.8 X 169.0 DEGREES

REPORT NUMBER: RAB03313 PAGE: 4 OF 8
ISSUE DATE: 05/10/17 DATE SAMPLE TESTED: 05/10/17
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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	849	849	849	849	849
2.5	838	842	854	857	856
5.0	834	838	850	854	853
7.5	829	833	845	850	850
10.0	821	826	839	845	846
12.5	811	817	831	838	839
15.0	800	806	821	828	830
17.5	785	791	808	817	820
20.0	769	776	795	805	807
22.5	752	759	780	790	795
25.0	732	740	762	775	781
27.5	709	719	744	758	764
30.0	688	698	725	740	747
32.5	663	674	703	721	729
35.0	637	649	680	699	709
37.5	610	622	655	676	684
40.0	582	595	629	651	659
42.5	553	567	603	624	634
45.0	522	540	575	597	606
47.5	492	511	546	567	578
50.0	461	481	515	536	547
52.5	431	452	484	507	518
55.0	400	421	452	477	490
57.5	373	392	420	447	462
60.0	340	363	389	418	433
62.5	308	331	360	392	406
65.0	275	298	330	367	383
67.5	244	265	301	340	355
70.0	212	233	272	312	328
72.5	181	200	245	283	294
75.0	151	169	218	246	259
77.5	122	142	189	209	218
80.0	95	117	156	169	174
82.5	69	92	120	124	126
85.0	44	65	79	75	76
87.5	22	36	34	27	26
90.0	4	4	2	1	1

REPORT NUMBER: RAB03313 PAGE: 5 OF 8
ISSUE DATE: 05/10/17 DATE SAMPLE TESTED: 05/10/17
CATALOG NUMBER: RTLED1X4-19YNW/D10

ZONAL LUMEN SUMMARY

0- 5	20.
5- 10	60.
10- 15	98.
15- 20	133.
20- 25	163.
25- 30	187.
30- 35	205.
35- 40	217.
40- 45	221.
45- 50	218.
50- 55	208.
55- 60	194.
60- 65	175.
65- 70	153.
70- 75	126.
75- 80	95.
80- 85	58.
85- 90	18.

REPORT NUMBER: RAB03313 PAGE: 6 OF 8
ISSUE DATE: 05/10/17 DATE SAMPLE TESTED: 05/10/17
CATALOG NUMBER: RTLED1X4-19YNW/D10

5-DEGREE ZONAL LUMEN SUMMARY	
0- 5	20
5- 10	60
10- 15	98
15- 20	133
20- 25	163
25- 30	187
30- 35	205
35- 40	217
40- 45	221
45- 50	218
50- 55	208
55- 60	194
60- 65	175
65- 70	153
70- 75	126
75- 80	95
80- 85	58
85- 90	18
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	80
0- 20	311
0- 30	661
0- 40	1083
0- 50	1521
0- 60	1923
0- 70	2251
0- 80	2472
0- 90	2548
0-100	2548
0-110	2548
0-120	2548
0-130	2548
0-140	2548
0-150	2548
0-160	2548
0-170	2548
0-180	2548

REPORT NUMBER: RAB03313 PAGE: 7 OF 8
ISSUE DATE: 05/10/17 DATE SAMPLE TESTED: 05/10/17

CATALOG NUMBER: RTLED1X4-19YNW/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	90	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	65	60	68	63	59	56
4	81	69	60	53	79	67	59	52	65	57	52	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	45	39	51	44	38	49	43	38	36
7	64	50	41	35	62	49	41	35	48	40	34	46	39	34	45	39	34	32
8	59	46	37	31	58	45	37	31	44	36	31	42	35	30	41	35	30	28
9	55	42	33	28	54	41	33	28	40	33	28	39	32	27	38	32	27	25
10	52	39	31	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.

REPORT NUMBER: RAB03313
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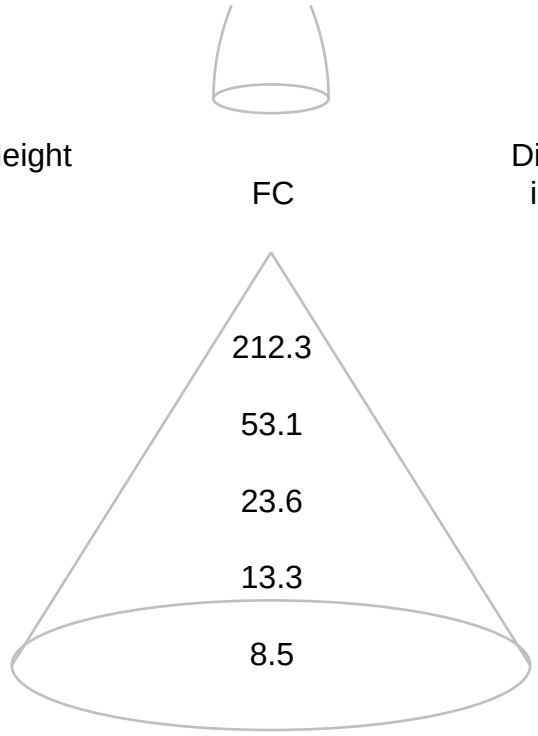
DATE SAMPLE TESTED: 05/10/17

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	212.3	2.5
4.0	53.1	5.0
6.0	23.6	7.6
8.0	13.3	10.1
10.0	8.5	12.6

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: RAB03314
DATE: 5/11/2017
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: RTLED1X4-19YNW/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 FLECO TXF131A232MV UL E43814 HOUSING.

LAMP: EIGHTY 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	05/03/18
RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	05/03/18

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)	2548 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4021
Chromaticity Ordinate y	0.3885
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2345
Chromaticity Ordinate v'	0.5099
Correlated Color Temp CCT (K)	3552
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	7750 *
ELECTRICAL	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.078
Input Power (Watts)	19.3
Input Power Factor (%)	88.9
Input Current THD (%)	13.0
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	132.0
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.157
Input Power (Watts)	18.5
Input Power Factor (%)	98.3
Input Current THD (%)	13.9
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	85
R1 Light greyish red	83
R2 Dark greyish yellow	91
R3 Strong yellowish green	97
R4 Moderate yellowish green	84
R5 Light bluish green	84
R6 Light blue	89
R7 Light violet	85
R8 Light reddish purple	64
R9 Strong red	13
R10 Strong yellow	79
R11 Strong green	84
R12 Strong blue	72
R13 Light yellowish pink (skin)	85
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.

REPORT NUMBER: RAB03314 Page 3 of 4
DATE: 5/11/2017
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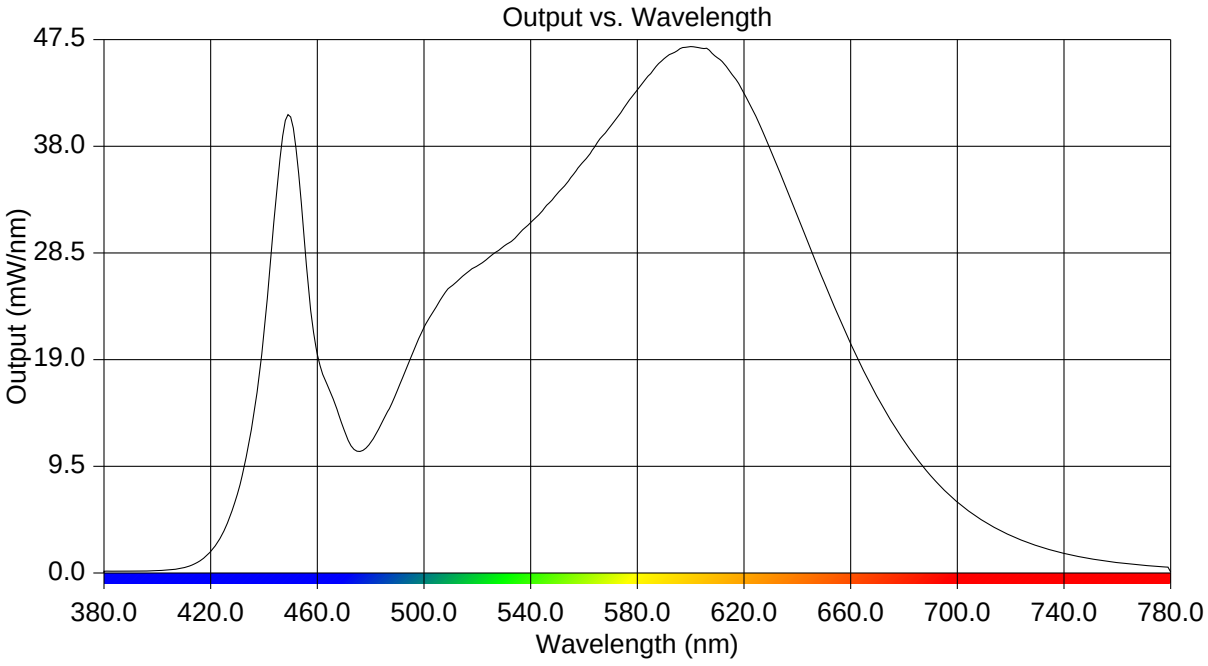
RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.154	515	26.527	650	25.932
385	0.164	520	27.352	655	23.065
390	0.171	525	28.232	660	20.451
395	0.172	530	29.116	665	17.981
400	0.222	535	30.041	670	15.668
405	0.289	540	31.182	675	13.612
410	0.483	545	32.450	680	11.764
415	0.940	550	33.813	685	10.123
420	1.914	555	35.202	690	8.666
425	3.768	560	36.704	695	7.423
430	7.006	565	38.338	700	6.342
435	12.435	570	39.785	705	5.403
440	21.390	575	41.438	710	4.595
445	34.510	580	43.025	715	3.906
450	40.615	585	44.472	720	3.339
455	30.024	590	45.802	725	2.832
460	19.461	595	46.515	730	2.412
465	16.055	600	46.884	735	2.042
470	12.770	605	46.707	740	1.746
475	10.852	610	45.891	745	1.492
480	11.643	615	44.569	750	1.271
485	13.752	620	42.726	755	1.090
490	16.254	625	40.410	760	0.934
495	19.139	630	37.648	765	0.796
500	21.878	635	34.757	770	0.686
505	23.887	640	31.833	775	0.585
510	25.498	645	28.827	780	0.088



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CIE Chromaticity Diagram