RAB LIGHTING

NVLAP LAB CODE: 201058-0

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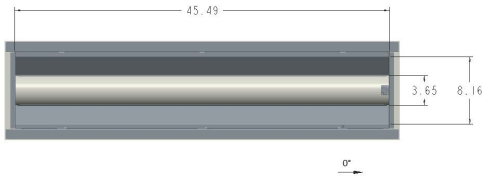
REPORT NUMBER: RAB03321 PAGE: 1 OF 8
ISSUE DATE: 05/11/17 DATE SAMPLE TESTED: 05/11/17
CATALOG NUMBER: RTLED1X4-29YW/D10
LUMINAIRE: WHITE PAINTED SHEET METAL HOUSING, 2 WHITE CIRCUIT BOARDS EACH WITH 60 LEDS, MATTE WHITE POLYCARBONATE LENS IN THE CENTER, ROUGH SURFACE FACING OUT. FIXTURE WAS MOUNTED IN FLECO TXF131A232MV UL E43814 HOUSING.
LAMPS: ONE HUNDRED AND TWENTY 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	1239	1239	1239	1239	1239	
5	1216	1224	1241	1246	1244	117
15	1167	1176	1198	1207	1210	336
25	1067	1080	1111	1130	1138	510
35	928	947	990	1020	1031	615
45	761	788	837	870	881	640
55	583	616	657	695	712	585
65	396	430	473	530	551	473
75	218	247	316	361	375	320
85	62	94	111	110	108	109
90	3	2	1	1	1	



ZONAL LUMEN SUMMARY

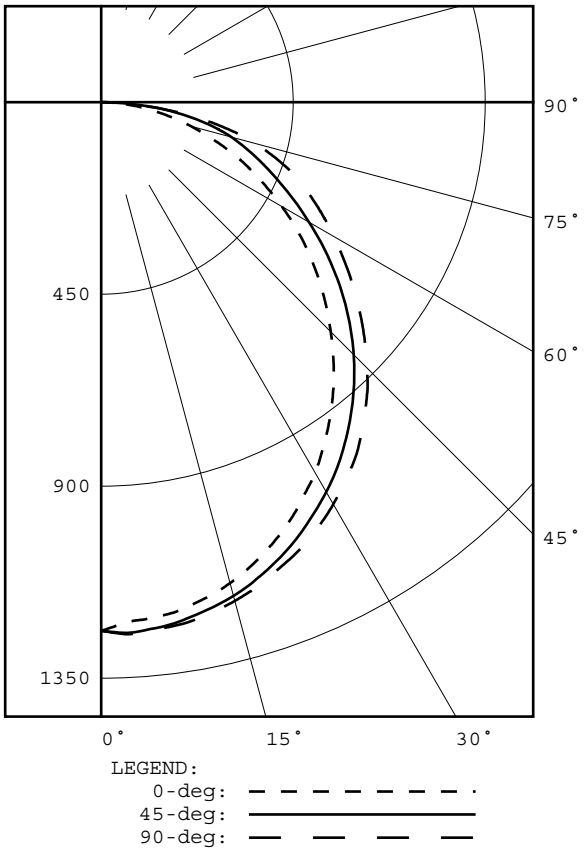
ZONE	LUMENS	%FIXT
0- 30	963	26.0
0- 40	1579	42.6
0- 60	2803	75.6
0- 90	3706	100.0
90-180	0	0.0
0-180	3706	100.0

TOTAL INPUT WATTS = 28.6
EFFICACY = 129.6 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	4492.	4941.	5201.
55	4243.	4781.	5182.
65	3911.	4672.	5442.
75	3516.	5096.	6048.
85	2969.	5316.	5172.



Checked	P.ALBERS
Approved	D.WANG-MUNSON

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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 = 28.604 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: 24.5
ACCREDITED LABORATORY CODE 201058-0

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PLANE	:	0-DEG 90-DEG
BEAM ANGLE (50%)	:	105.4 X 120.6 DEGREES
FIELD ANGLE (10%)	:	161.5 X 168.9 DEGREES

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	1239	1239	1239	1239	1239
2.5	1222	1228	1245	1249	1248
5.0	1216	1224	1241	1246	1244
7.5	1210	1217	1235	1241	1240
10.0	1198	1206	1224	1233	1234
12.5	1184	1192	1212	1222	1223
15.0	1167	1176	1198	1207	1210
17.5	1146	1156	1180	1192	1195
20.0	1122	1133	1159	1174	1176
22.5	1096	1108	1137	1152	1158
25.0	1067	1080	1111	1130	1138
27.5	1034	1049	1083	1105	1114
30.0	1003	1017	1055	1080	1088
32.5	966	983	1024	1051	1059
35.0	928	947	990	1020	1031
37.5	889	909	954	986	997
40.0	848	870	917	950	960
42.5	805	830	878	911	923
45.0	761	788	837	870	881
47.5	717	746	794	827	839
50.0	673	703	750	783	797
52.5	628	660	704	739	753
55.0	583	616	657	695	712
57.5	537	570	611	653	670
60.0	489	524	562	611	629
62.5	442	478	517	570	590
65.0	396	430	473	530	551
67.5	353	387	431	491	513
70.0	306	339	392	451	472
72.5	261	291	354	409	424
75.0	218	247	316	361	375
77.5	176	206	272	307	317
80.0	136	169	223	247	252
82.5	98	134	169	181	182
85.0	62	94	111	110	108
87.5	29	48	47	38	34
90.0	3	2	1	1	1

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ZONAL LUMEN SUMMARY

0- 5	30.
5- 10	88.
10- 15	143.
15- 20	193.
20- 25	237.
25- 30	273.
30- 35	299.
35- 40	316.
40- 45	322.
45- 50	317.
50- 55	304.
55- 60	281.
60- 65	253.
65- 70	220.
70- 75	182.
75- 80	138.
80- 85	84.
85- 90	25.

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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	30
5- 10	88
10- 15	143
15- 20	193
20- 25	237
25- 30	273
30- 35	299
35- 40	316
40- 45	322
45- 50	317
50- 55	304
55- 60	281
60- 65	253
65- 70	220
70- 75	182
75- 80	138
80- 85	84
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	117
0- 20	454
0- 30	963
0- 40	1579
0- 50	2218
0- 60	2803
0- 70	3277
0- 80	3597
0- 90	3706
0-100	3706
0-110	3706
0-120	3706
0-130	3706
0-140	3706
0-150	3706
0-160	3706
0-170	3706
0-180	3706

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CATALOG NUMBER: RTLED1X4-29YW/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	101	96	93	96	93	90	92	89	87	89	86	84	82
2	98	89	82	76	95	87	81	75	84	78	73	80	76	71	77	73	70	68
3	89	78	69	63	86	76	68	62	73	66	61	70	65	60	68	63	59	56
4	81	69	60	53	79	67	59	52	65	58	52	63	56	51	60	55	50	48
5	75	61	52	45	72	60	52	45	58	50	45	56	49	44	54	48	44	41
6	69	55	46	39	67	54	46	39	52	45	39	51	44	39	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	30	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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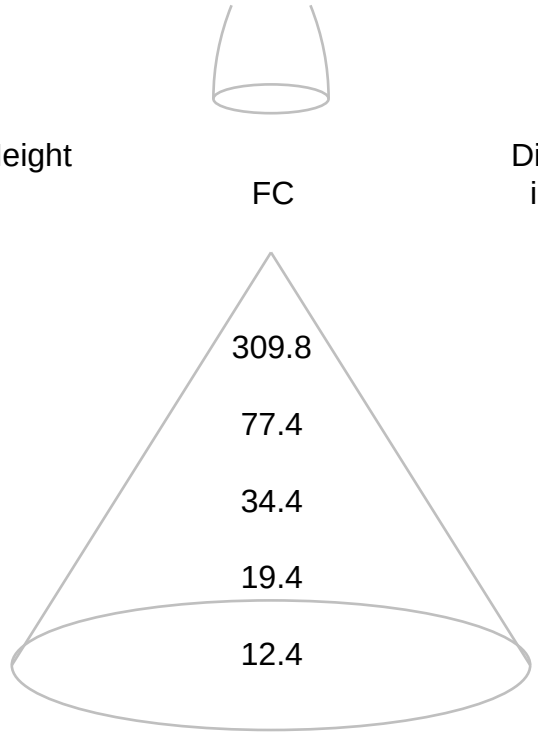
DATE SAMPLE TESTED: 05/11/17

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	309.8	2.5
4.0	77.4	5.0
6.0	34.4	7.6
8.0	19.4	10.1
10.0	12.4	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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PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: RTLED1X4-29YW/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 FLECO TXF131A232MV UL E43814 HOUSING.

LAMP: ONE HUNDRED AND TWENTY 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	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)	3706 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4313
Chromaticity Ordinate y	0.3998
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2487
Chromaticity Ordinate v'	0.5189
Correlated Color Temp CCT (K)	3063
ANSI C78.377-2008 Duv	-0.001
Total Radiant Flux (milliWatts)	11302 *
ELECTRICAL	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.111
Input Power (Watts)	28.6
Input Power Factor (%)	92.8
Input Current THD (%)	11.4
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	129.6
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.236
Input Power (Watts)	28.1
Input Power Factor (%)	99.3
Input Current THD (%)	10.8
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	92
R3 Strong yellowish green	97
R4 Moderate yellowish green	83
R5 Light bluish green	84
R6 Light blue	91
R7 Light violet	83
R8 Light reddish purple	60
R9 Strong red	10
R10 Strong yellow	81
R11 Strong green	84
R12 Strong blue	77
R13 Light yellowish pink (skin)	84
R14 Moderate olive green (leaf)	99

*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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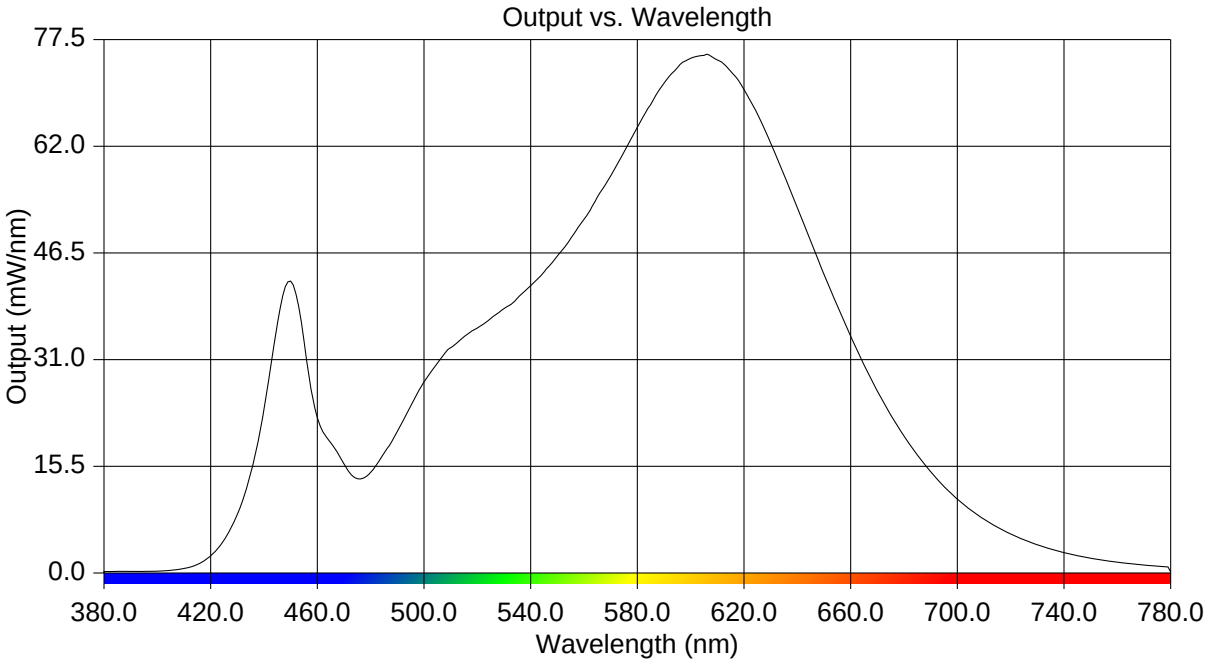
RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.213	515	34.314	650	43.393
385	0.219	520	35.608	655	38.787
390	0.233	525	36.980	660	34.424
395	0.247	530	38.417	665	30.285
400	0.279	535	39.915	670	26.463
405	0.380	540	41.733	675	23.002
410	0.628	545	43.726	680	19.874
415	1.239	550	46.078	685	17.139
420	2.479	555	48.606	690	14.727
425	4.762	560	51.400	695	12.590
430	8.517	565	54.621	700	10.754
435	14.481	570	57.664	705	9.172
440	23.756	575	61.206	710	7.815
445	36.131	580	64.789	715	6.632
450	42.414	585	68.060	720	5.667
455	33.742	590	71.165	725	4.824
460	22.571	595	73.414	730	4.107
465	18.920	600	74.797	735	3.476
470	15.850	605	75.212	740	2.955
475	13.698	610	74.551	745	2.527
480	14.639	615	72.911	750	2.158
485	17.411	620	70.253	755	1.835
490	20.574	625	66.750	760	1.568
495	24.221	630	62.469	765	1.337
500	27.769	635	57.852	770	1.147
505	30.490	640	53.067	775	0.992
510	32.739	645	48.211	780	0.149



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CIE Chromaticity Diagram