

REPORT NUMBER: RAB04605

PAGE: 1 OF 6

ISSUE DATE: 09/06/18

DATE SAMPLE TESTED: 09/06/18

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

CATALOG NUMBER: CDL4 [WD, S, PC, PS] -20W80D950-ODLENS

LUMINAIRE: EXTRUDED BLACK PAINTED METAL HOUSING, CAST FINNED METAL HEAT SINK, 1 WHITE CIRCUIT BOARD WITH 1 LED, MOLDED PLASTIC UPPER REFLECTOR, HOLOGRAPHIC PLASTIC LENS OVER UPPER APERTURE OF LOWER REFLECTOR, ALUMINUM TRIM DOOR WITH GLASS LENS.

LAMP: ONE WHITE LIGHT EMITTING DIODES (LEDS).

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.

ABSOLUTE: NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.

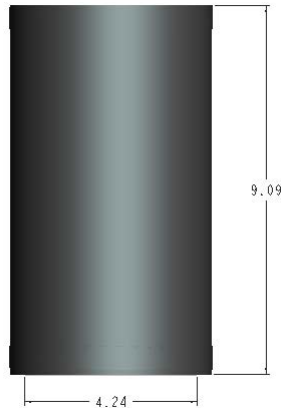
WATT: TOTAL INPUT WATTS = 19.8 W AT 277.0 VAC.

LED DRIVER: LED DRIVER: RDD-30W-042SE-A0500

PROCEDURE: TEST PROCEDURE: IESNA LM-79-08

NOTE: LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE
AMBIENT: 24.9

NVLAP LAB CODE: ACCREDITED LABORATORY CODE 201058-0



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Checked X.CAO

Approved D.WANG-MUNSON

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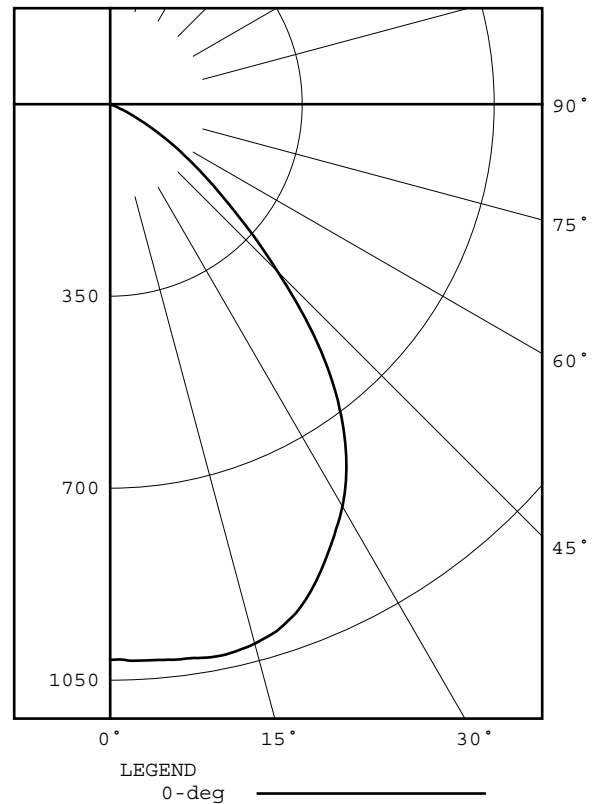
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DEG	CANDELA	LUMENS
0	1013	
5	1017	97
15	1018	287
25	922	424
35	745	462
45	432	335
55	172	157
65	29	34
75	2	3
85	1	1
90	0	
95	0	0
105	0	0
115	0	0
125	0	0
135	0	0
145	0	0
155	0	0
165	0	0
175	0	0
180	0	

ZONAL ZONE	LUMEN LUMENS	SUMMARY %FIXT
0- 30	809	44.9
0- 40	1270	70.6
0- 60	1762	97.9
0- 90	1800	100.0
90-120	0	0.0
90-130	0	0.0
90-150	0	0.0
90-180	0	0.0
0-180	1800	100.0

EFFICACY = 90.9 lm/W
CIE TYPE - DIRECT
SPACING CRITERION: 1.22



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CANDELA DISTRIBUTION

0.0	1013	60.0	89	120.0	0	180.0	0
1.0	1012	61.0	74	121.0	0		
2.0	1015	62.0	61	122.0	0		
3.0	1016	63.0	49	123.0	0		
4.0	1016	64.0	38	124.0	0		
5.0	1017	65.0	29	125.0	0		
6.0	1018	66.0	21	126.0	0		
7.0	1020	67.0	14	127.0	0		
8.0	1020	68.0	10	128.0	0		
9.0	1022	69.0	7	129.0	0		
10.0	1024	70.0	5	130.0	0		
11.0	1025	71.0	5	131.0	0		
12.0	1025	72.0	4	132.0	0		
13.0	1023	73.0	3	133.0	0		
14.0	1021	74.0	3	134.0	0		
15.0	1018	75.0	2	135.0	0		
16.0	1014	76.0	2	136.0	0		
17.0	1010	77.0	2	137.0	0		
18.0	1004	78.0	2	138.0	0		
19.0	996	79.0	2	139.0	0		
20.0	988	80.0	1	140.0	0		
21.0	977	81.0	1	141.0	0		
22.0	965	82.0	1	142.0	0		
23.0	952	83.0	1	143.0	0		
24.0	938	84.0	1	144.0	0		
25.0	922	85.0	1	145.0	0		
26.0	908	86.0	1	146.0	0		
27.0	893	87.0	0	147.0	0		
28.0	877	88.0	0	148.0	0		
29.0	863	89.0	0	149.0	0		
30.0	847	90.0	0	150.0	0		
31.0	829	91.0	0	151.0	0		
32.0	811	92.0	0	152.0	0		
33.0	791	93.0	0	153.0	0		
34.0	769	94.0	0	154.0	0		
35.0	745	95.0	0	155.0	0		
36.0	721	96.0	0	156.0	0		
37.0	695	97.0	0	157.0	0		
38.0	668	98.0	0	158.0	0		
39.0	639	99.0	0	159.0	0		
40.0	608	100.0	0	160.0	0		
41.0	575	101.0	0	161.0	0		
42.0	540	102.0	0	162.0	0		
43.0	504	103.0	0	163.0	0		
44.0	469	104.0	0	164.0	0		
45.0	432	105.0	0	165.0	0		
46.0	398	106.0	0	166.0	0		
47.0	369	107.0	0	167.0	0		
48.0	337	108.0	0	168.0	0		
49.0	308	109.0	0	169.0	0		
50.0	281	110.0	0	170.0	0		
51.0	256	111.0	0	171.0	0		
52.0	234	112.0	0	172.0	0		
53.0	212	113.0	0	173.0	0		
54.0	191	114.0	0	174.0	0		
55.0	172	115.0	0	175.0	0		
56.0	154	116.0	0	176.0	0		
57.0	137	117.0	0	177.0	0		
58.0	120	118.0	0	178.0	0		
59.0	105	119.0	0	179.0	0		

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5-DEGREE
ZONAL LUMEN SUMMARY

0- 5	24
5- 10	73
10- 15	121
15- 20	166
20- 25	201
25- 30	224
30- 35	235
35- 40	226
40- 45	193
45- 50	143
50- 55	97
55- 60	60
60- 65	27
65- 70	7
70- 75	2
75- 80	1
80- 85	1
85- 90	0
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	97
0- 20	384
0- 30	809
0- 40	1270
0- 50	1605
0- 60	1762
0- 70	1796
0- 80	1799
0- 90	1800
0-100	1800
0-110	1800
0-120	1800
0-130	1800
0-140	1800
0-150	1800
0-160	1800
0-170	1800
0-180	1800

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COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

EFFECTIVE FLOOR CAVITY REFLECTANCE 0.20

RC RW	80				70				50			30			10			0			
	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	111	111	111	106	106	106	102	102	102	100
1	112	109	106	103	110	107	104	102	103	100	98	99	97	95	95	94	93	95	94	93	91
2	105	99	94	90	103	97	93	89	94	90	87	91	88	85	88	85	83	88	85	83	81
3	98	90	84	79	96	89	83	78	86	81	77	83	79	76	81	77	75	81	77	75	73
4	91	82	75	70	89	81	74	70	79	73	69	76	72	68	74	70	67	74	70	67	65
5	85	75	68	62	83	74	67	62	72	66	62	70	65	61	69	64	60	69	64	60	59
6	80	69	61	56	78	68	61	56	66	60	55	65	59	55	63	58	55	63	58	55	53
7	75	63	56	51	73	62	56	51	61	55	50	60	54	50	59	53	50	59	53	50	48
8	70	58	51	46	68	58	51	46	57	50	46	55	50	46	54	49	45	54	49	45	44
9	66	54	47	42	64	54	47	42	52	46	42	51	46	42	51	45	42	51	45	42	40
10	62	50	43	39	61	50	43	39	49	43	39	48	42	38	47	42	38	47	42	38	37

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 TEST SAMPLE.

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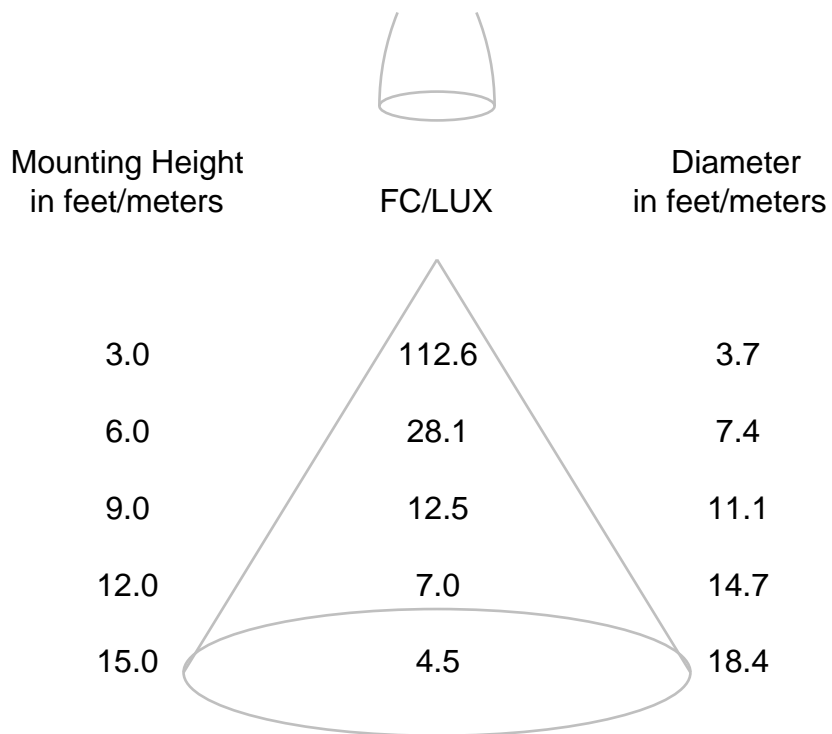
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CONE OF LIGHT DIAGRAM

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



If distances are feet, results are footcandles.
If distances are meters, results are lux.

REPORT NUMBER: RAB04614
DATE: 9/7/2018
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
CATALOG NUMBER: CDL4 [WD, WU, S, PC, PS] -20W80D950-ODLENS

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ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: EXTRUDED BLACK PAINTED METAL HOUSING, CAST FINNED METAL HEAT SINK, 1 WHITE CIRCUIT BOARD WITH 1 LED, MOLDED PLASTIC UPPER REFLECTOR, HOLOGRAPHIC PLASTIC LENS OVER UPPER APERTURE OF LOWER REFLECTOR, ALUMINUM TRIM DOOR WITH GLASS LENS.

LAMP: ONE WHITE LIGHT EMITTING DIODES (LEDS).

DRIVER: RDD-30W-042SE-A0500

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: GWINSTEK PROGRAMMABLE AC POWER SOURCE APS-7100
CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202
OCEAN OPTICS QE65PRO Spectroradiometer
RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry

Calibration Due:
N/A
3/08/19
08/22/19
08/22/19

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	<u>X.CAO</u>
Approved	<u>D.WANG-MUNSON</u> Lighting Engineer

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RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	1800 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3461
Chromaticity Ordinate y	0.3560
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2104
Chromaticity Ordinate v'	0.4870
Correlated Color Temp CCT (K)	4976
ANSI C78.377-2008 Duv	0.002
Total Radiant Flux (milliWatts)	6258 *
ELECTRICAL	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.083
Input Power (Watts)	19.8
Input Power Factor (%)	86.0
Input Current THD (%)	22.9
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
90.9	
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.162
Input Power (Watts)	19.1
Input Power Factor (%)	98.1
Input Current THD (%)	13.5
Input Voltage THD (%)	0.2
Off-State Power (Watts)	
0.0	

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	92
R1 Light greyish red	92
R2 Dark greyish yellow	96
R3 Strong yellowish green	96
R4 Moderate yellowish green	90
R5 Light bluish green	90
R6 Light blue	91
R7 Light violet	94
R8 Light reddish purple	87
R9 Strong red	68
R10 Strong yellow	88
R11 Strong green	89
R12 Strong blue	65
R13 Light yellowish pink (skin)	93
R14 Moderate olive green (leaf)	98

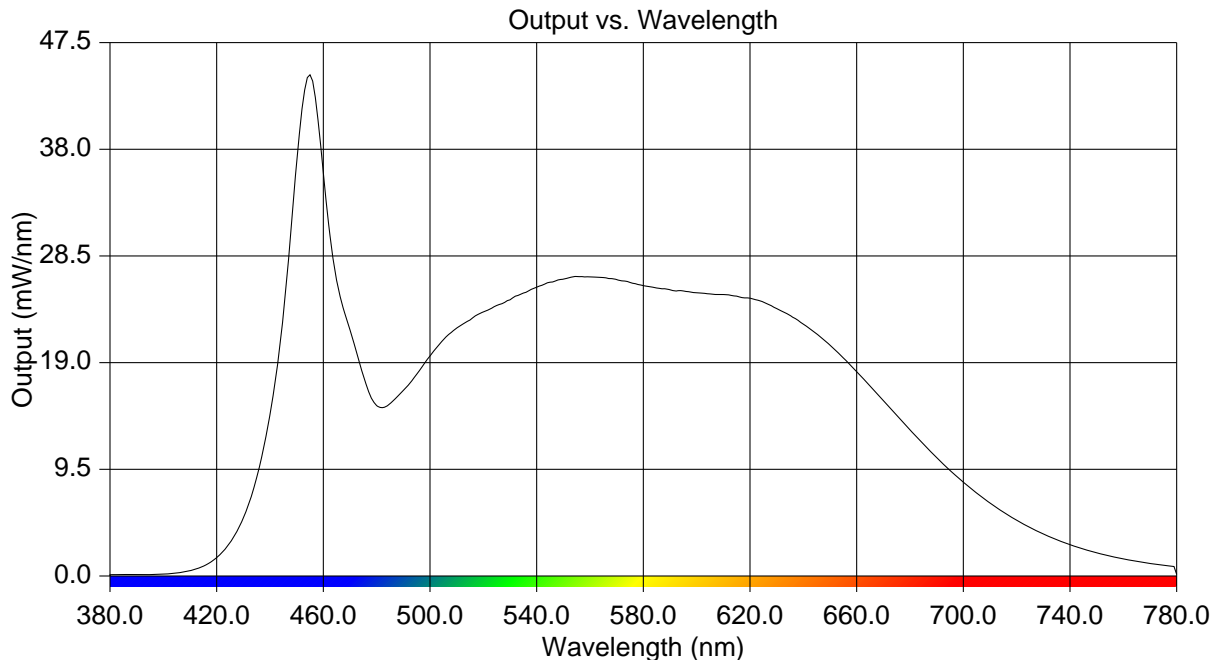
*NOTE:

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	0.109	515	22.797	650	20.546
385	0.116	520	23.519	655	19.419
390	0.120	525	24.092	660	18.201
395	0.138	530	24.595	665	16.934
400	0.170	535	25.198	670	15.646
405	0.266	540	25.722	675	14.309
410	0.464	545	26.165	680	13.028
415	0.878	550	26.442	685	11.739
420	1.641	555	26.673	690	10.530
425	2.963	560	26.655	695	9.401
430	5.179	565	26.580	700	8.376
435	8.762	570	26.405	705	7.383
440	14.311	575	26.145	710	6.507
445	23.415	580	25.858	715	5.699
450	36.712	585	25.649	720	4.971
455	44.639	590	25.498	725	4.322
460	35.909	595	25.387	730	3.736
465	26.292	600	25.210	735	3.227
470	21.921	605	25.123	740	2.778
475	17.848	610	25.067	745	2.397
480	15.174	615	24.925	750	2.074
485	15.354	620	24.744	755	1.777
490	16.528	625	24.410	760	1.530
495	17.963	630	23.819	765	1.308
500	19.592	635	23.212	770	1.119
505	21.054	640	22.414	775	0.961
510	22.082	645	21.561	780	0.143



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CIE Chromaticity Diagram

