

**REPORT NUMBER:**RAB04606

**PAGE:** 1 OF 6

**ISSUE DATE:**09/10/18

**DATE SAMPLE TESTED:** 09/10/18

**PREPARED FOR:** RAB LIGHTING INC. RC LIGHTING

**CATALOG NUMBER:** CDL4[WD, S, PC, PS]-20W80D940-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.

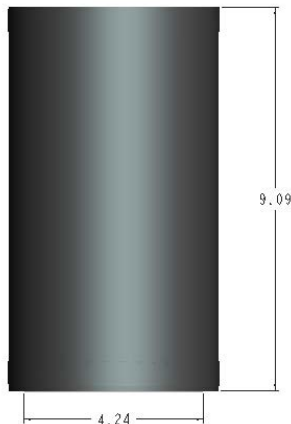
**WATT:** TOTAL INPUT WATTS = 19.8 W AT 277.0 VAC.

**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: 24.6

**NVLAP LAB CODE:** ACCREDITED LABORATORY CODE 201058-0



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Checked   X.CAO  

Approved   D.WANG-MUNSON

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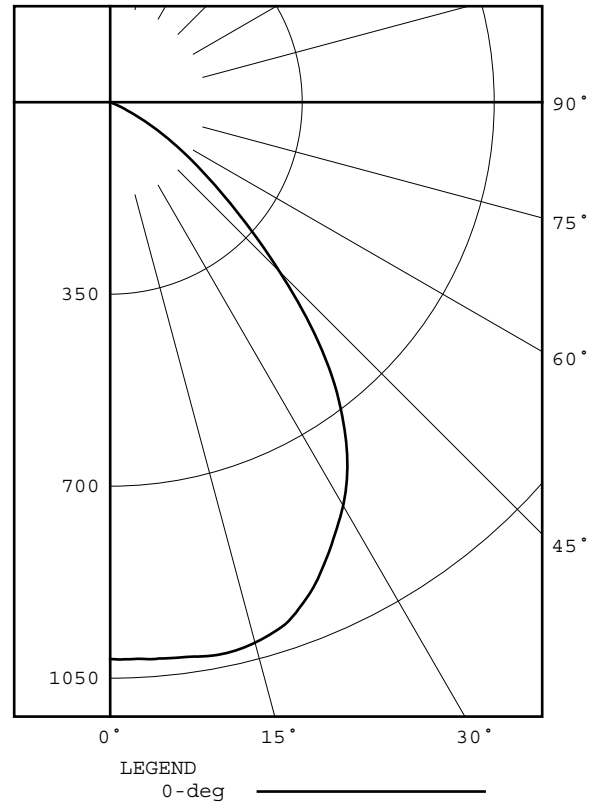
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CATALOG NUMBER: CDL4 [WD, S, PC, PS] -20W80D940-ODLENS

DEG	CANDELA	LUMENS
0	1015	
5	1018	97
15	1020	288
25	926	426
35	749	463
45	436	337
55	173	158
65	29	35
75	3	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	811	44.8
0- 40	1274	70.5
0- 60	1769	97.8
0- 90	1808	100.0
90-120	0	0.0
90-130	0	0.0
90-150	0	0.0
90-180	0	0.0
0-180	1808	100.0

EFFICACY = 91.3 lm/W  
CIE TYPE - DIRECT  
SPACING CRITERION: 1.22



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CANDELA DISTRIBUTION

0.0	1015	60.0	90	120.0	0	180.0	0
1.0	1016	61.0	75	121.0	0		
2.0	1016	62.0	62	122.0	0		
3.0	1016	63.0	50	123.0	0		
4.0	1018	64.0	39	124.0	0		
5.0	1018	65.0	29	125.0	0		
6.0	1019	66.0	22	126.0	0		
7.0	1020	67.0	15	127.0	0		
8.0	1021	68.0	10	128.0	0		
9.0	1023	69.0	7	129.0	0		
10.0	1025	70.0	6	130.0	0		
11.0	1026	71.0	5	131.0	0		
12.0	1026	72.0	4	132.0	0		
13.0	1025	73.0	3	133.0	0		
14.0	1023	74.0	3	134.0	0		
15.0	1020	75.0	3	135.0	0		
16.0	1016	76.0	3	136.0	0		
17.0	1012	77.0	2	137.0	0		
18.0	1007	78.0	2	138.0	0		
19.0	1000	79.0	2	139.0	0		
20.0	990	80.0	2	140.0	0		
21.0	979	81.0	1	141.0	0		
22.0	968	82.0	1	142.0	0		
23.0	955	83.0	1	143.0	0		
24.0	941	84.0	1	144.0	0		
25.0	926	85.0	1	145.0	0		
26.0	911	86.0	1	146.0	0		
27.0	895	87.0	1	147.0	0		
28.0	880	88.0	0	148.0	0		
29.0	865	89.0	0	149.0	0		
30.0	849	90.0	0	150.0	0		
31.0	832	91.0	0	151.0	0		
32.0	814	92.0	0	152.0	0		
33.0	794	93.0	0	153.0	0		
34.0	771	94.0	0	154.0	0		
35.0	749	95.0	0	155.0	0		
36.0	724	96.0	0	156.0	0		
37.0	698	97.0	0	157.0	0		
38.0	671	98.0	0	158.0	0		
39.0	642	99.0	0	159.0	0		
40.0	611	100.0	0	160.0	0		
41.0	577	101.0	0	161.0	0		
42.0	543	102.0	0	162.0	0		
43.0	508	103.0	0	163.0	0		
44.0	472	104.0	0	164.0	0		
45.0	436	105.0	0	165.0	0		
46.0	402	106.0	0	166.0	0		
47.0	370	107.0	0	167.0	0		
48.0	340	108.0	0	168.0	0		
49.0	311	109.0	0	169.0	0		
50.0	283	110.0	0	170.0	0		
51.0	258	111.0	0	171.0	0		
52.0	235	112.0	0	172.0	0		
53.0	213	113.0	0	173.0	0		
54.0	192	114.0	0	174.0	0		
55.0	173	115.0	0	175.0	0		
56.0	155	116.0	0	176.0	0		
57.0	138	117.0	0	177.0	0		
58.0	121	118.0	0	178.0	0		
59.0	106	119.0	0	179.0	0		

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5-DEGREE  
ZONAL LUMEN SUMMARY

0- 5	24
5- 10	73
10- 15	122
15- 20	166
20- 25	201
25- 30	224
30- 35	236
35- 40	227
40- 45	194
45- 50	144
50- 55	98
55- 60	60
60- 65	28
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	385
0- 30	811
0- 40	1274
0- 50	1611
0- 60	1769
0- 70	1804
0- 80	1807
0- 90	1808
0-100	1808
0-110	1808
0-120	1808
0-130	1808
0-140	1808
0-150	1808
0-160	1808
0-170	1808
0-180	1808

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**CATALOG NUMBER:** CDL4 [WD, S, PC, PS] -20W80D940-ODLENS

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	69	78	73	69	76	72	68	74	70	67	74	70	67	65
5	85	75	68	62	83	74	67	62	72	66	61	70	65	61	68	64	60	68	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	74	63	56	51	73	62	55	51	61	55	50	60	54	50	58	53	50	58	53	50	48
8	70	58	51	46	68	58	51	46	56	50	46	55	50	45	54	49	45	54	49	45	44
9	66	54	47	42	64	53	47	42	52	46	42	51	46	42	50	45	41	50	45	41	40
10	62	50	43	39	61	50	43	39	49	43	38	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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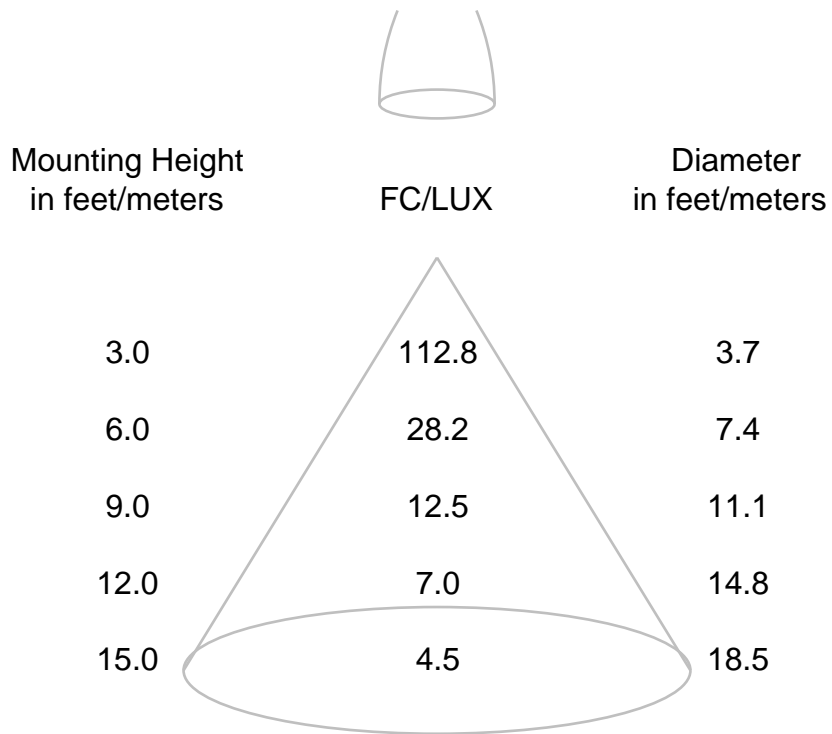
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## CONE OF LIGHT DIAGRAM

(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: RAB04615  
DATE: 9/7/2018  
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING  
CATALOG NUMBER: CDL4 [WD, WU, S, PC, PS] -20W80D940-ODLENS

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 N/A  
CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202 3/08/19  
OCEAN OPTICS QE65PRO Spectroradiometer 08/22/19  
RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry 08/22/19  
Calibration Due:

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

REPORT NUMBER: RAB04615  
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RESULTS:

<b>PHOTOMETRIC</b>	
Total Integrated Flux (lumens)	1808 *
<b>SPECTRORADIOMETRIC</b>	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3865
Chromaticity Ordinate y	0.3891
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2242
Chromaticity Ordinate v'	0.5078
Correlated Color Temp CCT (K)	3931
ANSI C78.377-2008 Duv	0.004
Total Radiant Flux (milliWatts)	5990 *
<b>ELECTRICAL</b>	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.083
Input Power (Watts)	19.8
Input Power Factor (%)	85.9
Input Current THD (%)	23.1
Input Voltage THD (%)	0.2
<b>EFFICACY (Lumens/Watt)</b>	
91.3	
<b>ELECTRICAL AT MAX NONIMAL INPUT</b>	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.163
Input Power (Watts)	19.1
Input Power Factor (%)	98.1
Input Current THD (%)	13.6
Input Voltage THD (%)	0.2
<b>Off-State Power (Watts)</b>	
0.0	

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	90
R1 Light greyish red	89
R2 Dark greyish yellow	93
R3 Strong yellowish green	95
R4 Moderate yellowish green	91
R5 Light bluish green	89
R6 Light blue	90
R7 Light violet	94
R8 Light reddish purple	82
R9 Strong red	52
R10 Strong yellow	82
R11 Strong green	90
R12 Strong blue	71
R13 Light yellowish pink (skin)	90
R14 Moderate olive green (leaf)	97

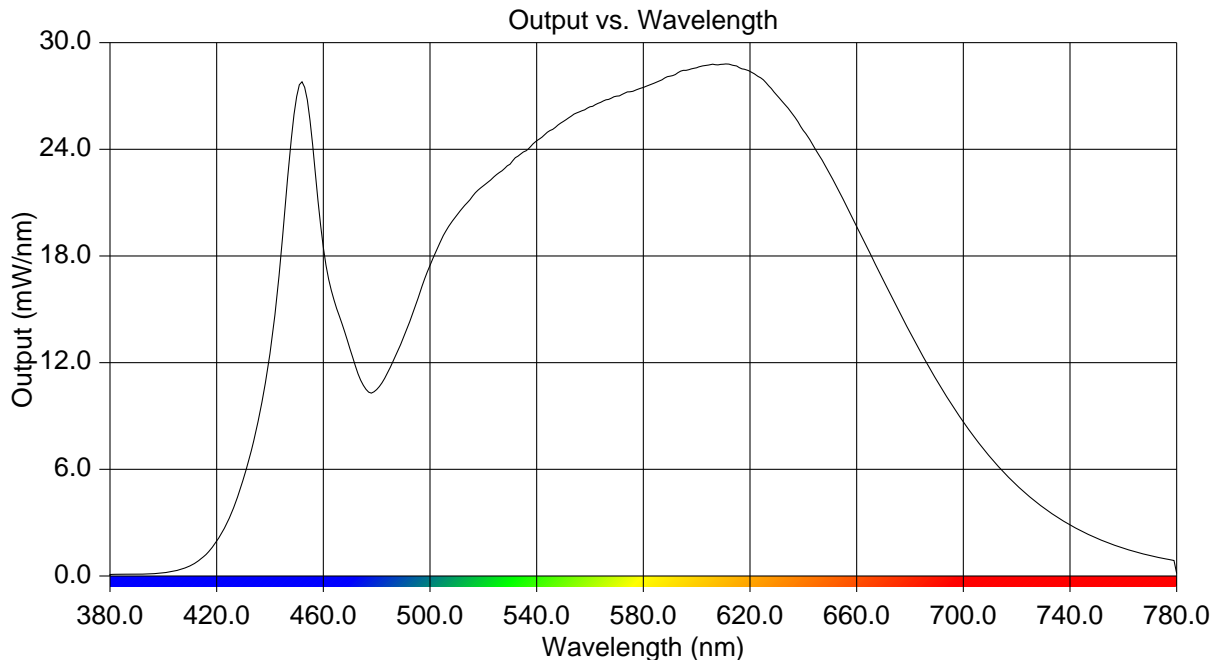
\*NOTE:

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	0.083	515	21.166	650	22.595
385	0.094	520	21.957	655	21.158
390	0.098	525	22.583	660	19.659
395	0.122	530	23.160	665	18.160
400	0.183	535	23.850	670	16.655
405	0.305	540	24.467	675	15.139
410	0.572	545	25.058	680	13.698
415	1.076	550	25.567	685	12.318
420	1.960	555	26.048	690	11.000
425	3.337	560	26.394	695	9.798
430	5.455	565	26.722	700	8.675
435	8.366	570	26.992	705	7.641
440	12.497	575	27.242	710	6.714
445	19.596	580	27.479	715	5.875
450	26.968	585	27.789	720	5.120
455	25.636	590	28.115	725	4.435
460	18.480	595	28.442	730	3.843
465	15.040	600	28.588	735	3.319
470	12.769	605	28.772	740	2.859
475	10.727	610	28.787	745	2.469
480	10.487	615	28.689	750	2.144
485	11.716	620	28.397	755	1.830
490	13.391	625	27.911	760	1.573
495	15.412	630	27.054	765	1.349
500	17.469	635	26.181	770	1.155
505	19.155	640	25.057	775	0.989
510	20.291	645	23.889	780	0.147



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### CIE Chromaticity Diagram

