

REPORT NUMBER:RAB04575

PAGE: 1 OF 6

ISSUE DATE:09/04/18

DATE SAMPLE TESTED: 09/04/18

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

CATALOG NUMBER: CDL4 [WD, S, PC, PS] -20W80D927-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.

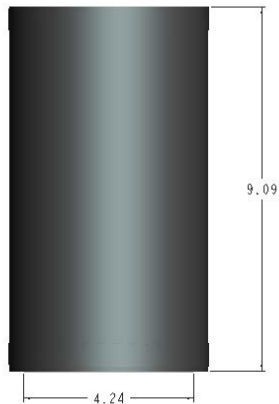
WATT: TOTAL INPUT WATTS = 19.8 W AT 277.0 VAC.

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: 24.5

NVLAP LAB CODE: ACCREDITED LABORATORY CODE 201058-0



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.

Checked X.CAO

Approved D.WANG-MUNSON

REPORT NUMBER: RAB04575

PAGE: 2 OF 6

ISSUE DATE: 09/04/18

DATE SAMPLE TESTED: 09/04/18

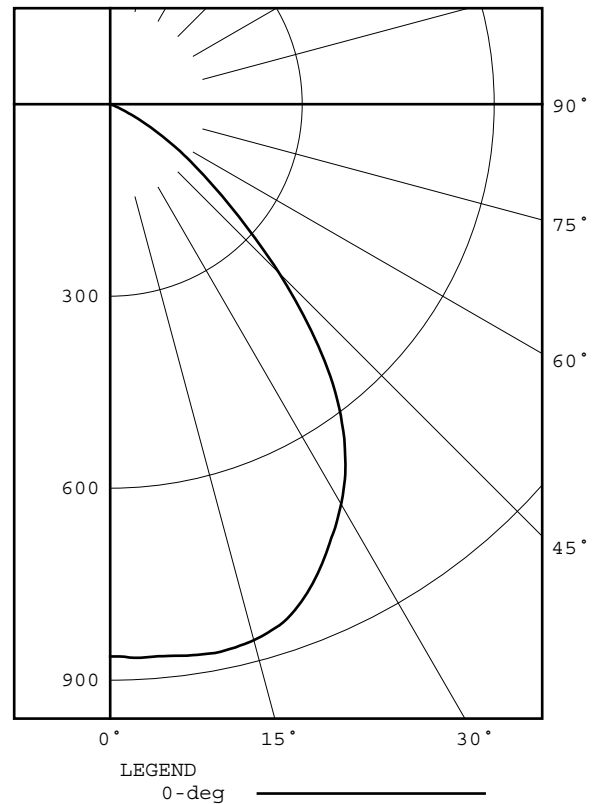
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

CATALOG NUMBER: CDL4 [WD, S, PC, PS] -20W80D927-ODLENS

DEG	CANDELA	LUMENS
0	863	
5	866	83
15	867	244
25	787	362
35	638	394
45	374	287
55	147	133
65	25	29
75	2	2
85	0	0
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	689	44.9
0- 40	1083	70.5
0- 60	1504	97.9
0- 90	1536	100.0
90-120	0	0.0
90-130	0	0.0
90-150	0	0.0
90-180	0	0.0
0-180	1536	100.0

EFFICACY = 77.6 lm/W
CIE TYPE - DIRECT
SPACING CRITERION: 1.22



REPORT NUMBER: RAB04575

PAGE: 3 OF 6

ISSUE DATE: 09/04/18

DATE SAMPLE TESTED: 09/04/18

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

CATALOG NUMBER: CDL4 [WD, S, PC, PS] -20W80D927-ODLENS

CANDELA DISTRIBUTION

0.0	863	60.0	76	120.0	0	180.0	0
1.0	863	61.0	64	121.0	0		
2.0	865	62.0	52	122.0	0		
3.0	866	63.0	42	123.0	0		
4.0	866	64.0	32	124.0	0		
5.0	866	65.0	25	125.0	0		
6.0	867	66.0	18	126.0	0		
7.0	868	67.0	12	127.0	0		
8.0	870	68.0	8	128.0	0		
9.0	871	69.0	6	129.0	0		
10.0	872	70.0	4	130.0	0		
11.0	873	71.0	4	131.0	0		
12.0	872	72.0	3	132.0	0		
13.0	871	73.0	3	133.0	0		
14.0	869	74.0	2	134.0	0		
15.0	867	75.0	2	135.0	0		
16.0	864	76.0	2	136.0	0		
17.0	860	77.0	2	137.0	0		
18.0	856	78.0	1	138.0	0		
19.0	850	79.0	1	139.0	0		
20.0	842	80.0	1	140.0	0		
21.0	833	81.0	1	141.0	0		
22.0	823	82.0	1	142.0	0		
23.0	812	83.0	1	143.0	0		
24.0	800	84.0	0	144.0	0		
25.0	787	85.0	0	145.0	0		
26.0	775	86.0	0	146.0	0		
27.0	761	87.0	0	147.0	0		
28.0	749	88.0	0	148.0	0		
29.0	735	89.0	0	149.0	0		
30.0	722	90.0	0	150.0	0		
31.0	707	91.0	0	151.0	0		
32.0	692	92.0	0	152.0	0		
33.0	675	93.0	0	153.0	0		
34.0	656	94.0	0	154.0	0		
35.0	638	95.0	0	155.0	0		
36.0	616	96.0	0	156.0	0		
37.0	595	97.0	0	157.0	0		
38.0	571	98.0	0	158.0	0		
39.0	546	99.0	0	159.0	0		
40.0	519	100.0	0	160.0	0		
41.0	490	101.0	0	161.0	0		
42.0	461	102.0	0	162.0	0		
43.0	432	103.0	0	163.0	0		
44.0	402	104.0	0	164.0	0		
45.0	374	105.0	0	165.0	0		
46.0	344	106.0	0	166.0	0		
47.0	315	107.0	0	167.0	0		
48.0	288	108.0	0	168.0	0		
49.0	263	109.0	0	169.0	0		
50.0	240	110.0	0	170.0	0		
51.0	218	111.0	0	171.0	0		
52.0	198	112.0	0	172.0	0		
53.0	180	113.0	0	173.0	0		
54.0	163	114.0	0	174.0	0		
55.0	147	115.0	0	175.0	0		
56.0	132	116.0	0	176.0	0		
57.0	116	117.0	0	177.0	0		
58.0	102	118.0	0	178.0	0		
59.0	89	119.0	0	179.0	0		

REPORT NUMBER: RAB04575

PAGE: 4 OF 6

ISSUE DATE: 09/04/18

DATE SAMPLE TESTED: 09/04/18

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

CATALOG NUMBER: CDL4 [WD, S, PC, PS] -20W80D927-ODLENS

5-DEGREE
ZONAL LUMEN SUMMARY

0- 5	21
5- 10	62
10- 15	103
15- 20	141
20- 25	171
25- 30	191
30- 35	201
35- 40	194
40- 45	165
45- 50	122
50- 55	83
55- 60	51
60- 65	23
65- 70	6
70- 75	2
75- 80	1
80- 85	0
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	83
0- 20	327
0- 30	689
0- 40	1083
0- 50	1371
0- 60	1504
0- 70	1533
0- 80	1536
0- 90	1536
0-100	1536
0-110	1536
0-120	1536
0-130	1536
0-140	1536
0-150	1536
0-160	1536
0-170	1536
0-180	1536

REPORT NUMBER: RAB04575

PAGE: 5 OF 6

ISSUE DATE: 09/04/18

DATE SAMPLE TESTED: 09/04/18

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

CATALOG NUMBER: CDL4 [WD, S, PC, PS] -20W80D927-ODLENS

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

REPORT NUMBER: RAB04575

PAGE: 6 OF 6

ISSUE DATE: 09/04/18

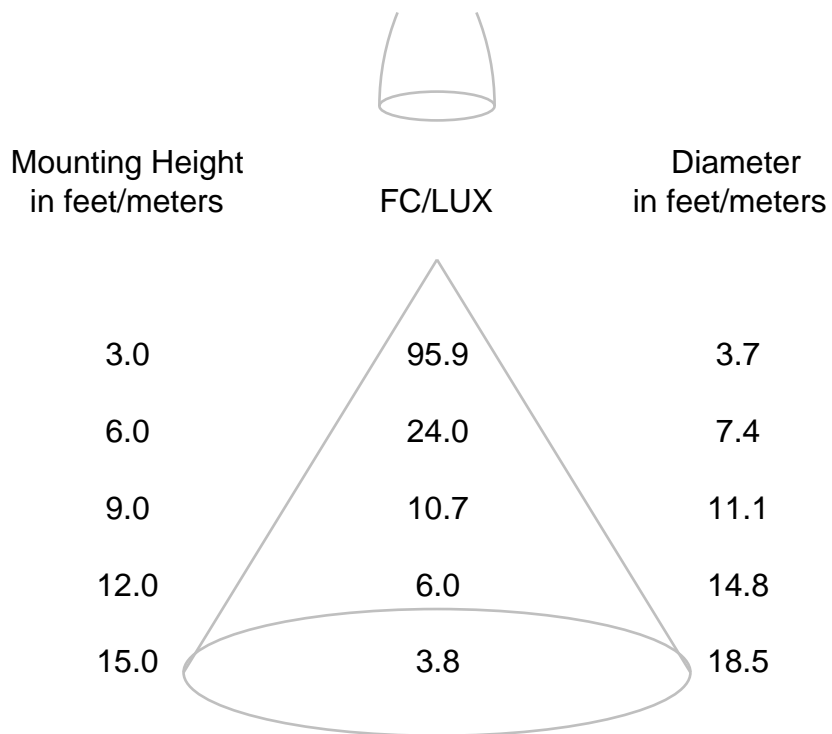
DATE SAMPLE TESTED: 09/04/18

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

CATALOG NUMBER: CDL4 [WD, S, PC, PS] -20W80D927-ODLENS

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: RAB04576
DATE: 8/30/2018
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
CATALOG NUMBER: CDL4 [WD, WU, S, PC, PS] -20W80D927-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

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: RAB04576
 DATE: 8/30/2018
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
 CATALOG NUMBER: CDL4 [WD, WU, S, PC, PS] -20W80D927-ODLENS

RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	1536 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4606
Chromaticity Ordinate y	0.4144
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2612
Chromaticity Ordinate v'	0.5289
Correlated Color Temp CCT (K)	2719
ANSI C78.377-2008 Duv	0.001
Total Radiant Flux (milliWatts)	5329 *
ELECTRICAL	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.083
Input Power (Watts)	19.8
Input Power Factor (%)	86.1
Input Current THD (%)	22.7
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
77.6	
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.163
Input Power (Watts)	19.2
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)	91
R1 Light greyish red	90
R2 Dark greyish yellow	95
R3 Strong yellowish green	99
R4 Moderate yellowish green	90
R5 Light bluish green	90
R6 Light blue	95
R7 Light violet	90
R8 Light reddish purple	77
R9 Strong red	51
R10 Strong yellow	89
R11 Strong green	90
R12 Strong blue	81
R13 Light yellowish pink (skin)	91
R14 Moderate olive green (leaf)	99

*NOTE:

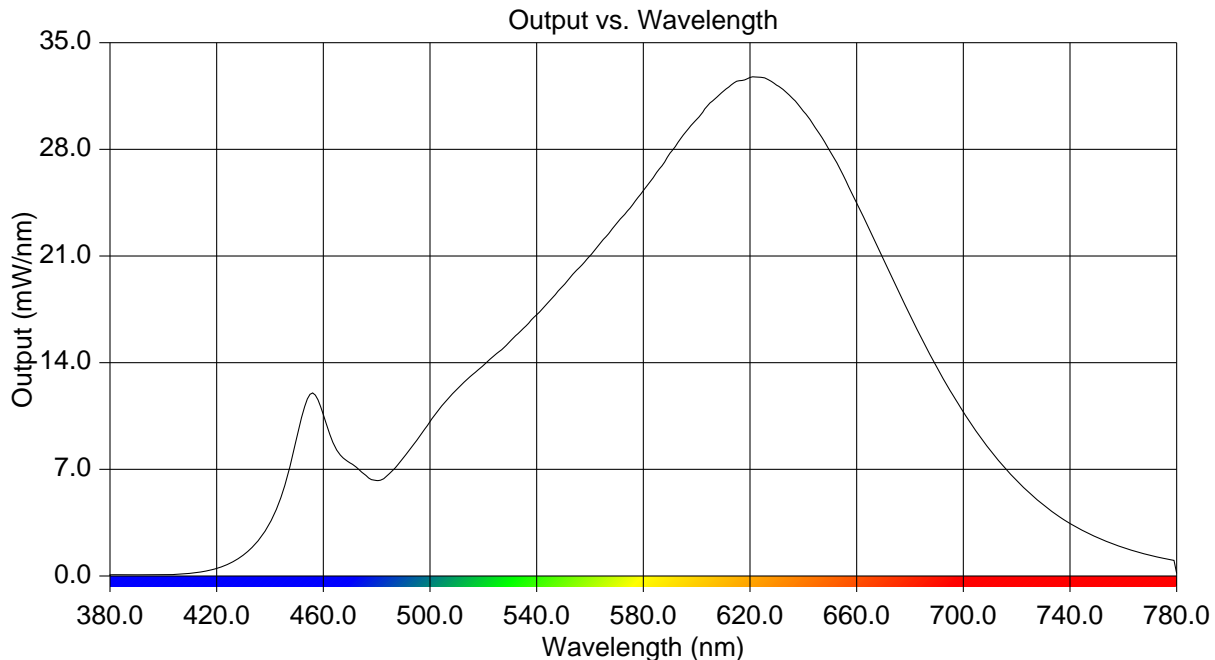
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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.

REPORT NUMBER: RAB04576
 DATE: 8/30/2018
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
 CATALOG NUMBER: CDL4 [WD, WU, S, PC, PS] -20W80D927-ODLENS

Page 3 of 4

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.076	515	13.076	650	27.870
385	0.077	520	13.816	655	26.287
390	0.073	525	14.600	660	24.485
395	0.077	530	15.394	665	22.643
400	0.085	535	16.247	670	20.796
405	0.108	540	17.145	675	18.939
410	0.172	545	18.082	680	17.131
415	0.287	550	19.053	685	15.362
420	0.498	555	20.071	690	13.706
425	0.831	560	21.018	695	12.177
430	1.383	565	22.088	700	10.757
435	2.194	570	23.148	705	9.459
440	3.508	575	24.138	710	8.280
445	5.621	580	25.265	715	7.209
450	9.061	585	26.486	720	6.254
455	11.922	590	27.748	725	5.423
460	10.592	595	28.943	730	4.664
465	8.272	600	29.959	735	4.012
470	7.421	605	31.045	740	3.443
475	6.730	610	31.825	745	2.965
480	6.264	615	32.468	750	2.551
485	6.763	620	32.717	755	2.185
490	7.760	625	32.715	760	1.866
495	8.891	630	32.208	765	1.588
500	10.109	635	31.509	770	1.361
505	11.301	640	30.503	775	1.162
510	12.247	645	29.283	780	0.173



REPORT NUMBER: RAB04576
DATE: 8/30/2018
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
CATALOG NUMBER: CDL4 [WD, WU, S, PC, PS] -20W80D927-ODLENS

Page 4 of 4

CIE Chromaticity Diagram

