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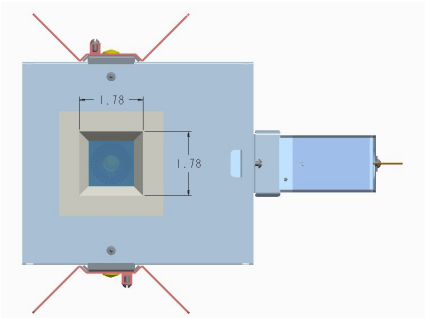
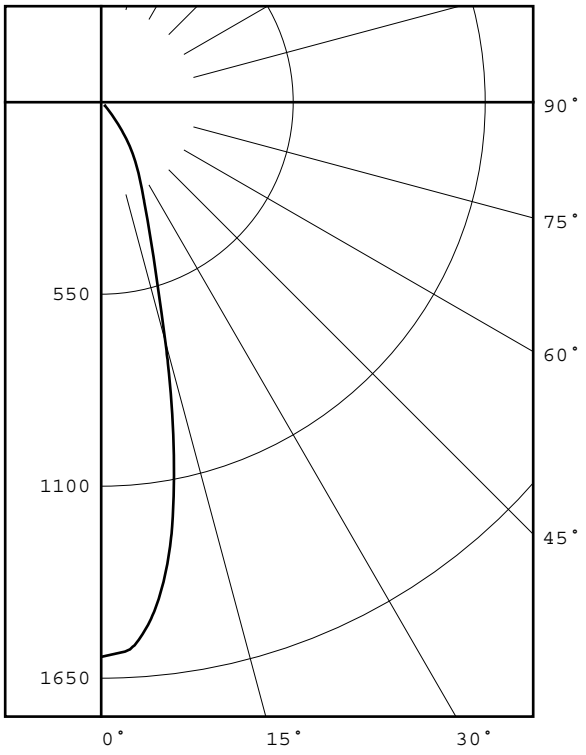
NVLAP LAB CODE: 201058-0

REPORT NUMBER: RAB01223 PAGE: 1 OF 7
ISSUE DATE: 10/01/15 DATE SAMPLE TESTED: 10/01/15
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: RDLED2S8-30YHC-TW (2" Square recessed downlight - medium beam - >90 High CRI)
LUMINAIRE: FABRICATED METAL UPPER HOUSING AND BALLAST HOUSING, CAST WHITE PAINTED FINNED METAL HEAT SINK, 1 WHITE CIRCUIT BOARD WITH ONE LED, MOLDED PLASTIC REFLECTOR WITH SPECULAR FINISH, HOLOGRAPHIC FLAT PLASTIC LENS, CAST WHITE PAINTED METAL LOWER HOUSING.
LAMP: ONE WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDS), VERTICAL BASE-UP POSITION.
NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.
TOTAL INPUT WATTS: 8.3129 W AT 120.0 VOLTS
TEST PROCEDURE: IESNA LM-79-08
TEST DISTANCE: 28.25 FEET
PREPARED FOR: RAB LIGHTING INC.
LED DRIVER:RD-008-E1-A0200
ACCREDITED LABORATORY CODE 201085-0



DEG	CANDELA	LUMENS
0	1589	
5	1508	134
15	710	200
25	276	130
35	116	73
45	21	19
55	7	7
65	3	3
75	1	1
85	0	0
90	0	



ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	464	81.9
0- 40	536	94.7
0- 60	562	99.2
0- 90	566	100.0
90-180	0	0.0
0-180	566	100.0

TOTAL INPUT WATTS = 8.3
EFFICACY = 68.2 Lm/W
CIE TYPE - DIRECT
LUMINAIRE SPACING CRITERION = 0.5

Checked *X.CAO*
Approved *D.WANG-MUNSON*

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BEAM ANGLE (50%) : 28.2 DEGREES
FIELD ANGLE (10%): 64.6 DEGREES

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CANDELA DISTRIBUTION

	0.0
0.0	1589
2.5	1575
5.0	1508
7.5	1379
10.0	1188
12.5	948
15.0	710
17.5	528
20.0	413
22.5	333
25.0	276
27.5	233
30.0	195
32.5	156
35.0	116
37.5	80
40.0	51
42.5	32
45.0	21
47.5	15
50.0	11
52.5	9
55.0	7
57.5	6
60.0	5
62.5	4
65.0	3
67.5	2
70.0	2
72.5	2
75.0	1
77.5	1
80.0	0
82.5	0
85.0	0
87.5	0
90.0	0

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ZONAL LUMEN SUMMARY

0- 5	37.
5- 10	97.
10- 15	111.
15- 20	89.
20- 25	71.
25- 30	59.
30- 35	46.
35- 40	27.
40- 45	13.
45- 50	6.
50- 55	4.
55- 60	3.
60- 65	2.
65- 70	1.
70- 75	1.
75- 80	0.
80- 85	0.
85- 90	0.

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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	37
5- 10	97
10- 15	111
15- 20	89
20- 25	71
25- 30	59
30- 35	46
35- 40	27
40- 45	13
45- 50	6
50- 55	4
55- 60	3
60- 65	2
65- 70	1
70- 75	1
75- 80	0
80- 85	0
85- 90	0

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	134
0- 20	334
0- 30	464
0- 40	536
0- 50	555
0- 60	562
0- 70	565
0- 80	566
0- 90	566

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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	114	112	110	108	112	110	108	106	106	104	103	102	101	100	98	98	97	95
2	109	105	102	99	107	103	100	98	100	98	95	97	95	93	95	93	91	90
3	105	99	95	92	103	98	94	91	95	92	89	93	90	88	91	89	87	85
4	101	94	89	86	99	93	89	85	91	87	84	89	86	83	87	85	82	81
5	97	89	84	81	95	89	84	80	87	83	80	85	82	79	84	81	78	77
6	93	85	80	76	91	84	80	76	83	79	76	82	78	75	80	77	75	73
7	89	81	76	73	88	81	76	72	80	75	72	78	75	72	77	74	71	70
8	86	78	73	69	85	77	73	69	76	72	69	75	71	69	74	71	68	67
9	83	75	70	66	82	74	69	66	73	69	66	73	69	66	72	68	66	64
10	80	72	67	64	79	71	67	63	71	66	63	70	66	63	69	66	63	62

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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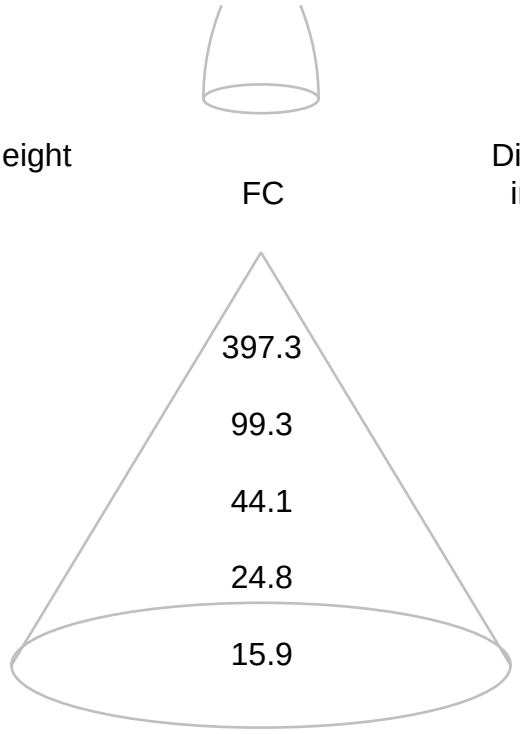
DATE SAMPLE TESTED: 10/01/15

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	397.3	1.0
4.0	99.3	1.9
6.0	44.1	2.9
8.0	24.8	3.8
10.0	15.9	4.8

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NVLAP LAB CODE: 201058-0

REPORT NUMBER: RAB01222
DATE: 10/2/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: RDLED2S8-30YHC-TW (2" Square recessed downlight - medium beam - >90 High CRI)

ADDRESS: 170 LUDLOW AVE, NORTHVALE NJ 07647

LUMINAIRE: FABRICATED METAL UPPER HOUSING AND BALLAST HOUSING, CAST WHITE PAINTED FINNED METAL HEAT SINK, 1 WHITE CIRCUIT BOARD WITH ONE LED, MOLDED PLASTIC REFLECTOR WITH SPECULAR FINISH, HOLOGRAPHIC FLAT PLASTIC LENS, CAST WHITE PAINTED METAL LOWER HOUSING.

LAMP: ONE WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDS), VERTICAL BASE-UP POSITION.

DRIVER: RD-008-E1-A0200

NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT RATED INPUT VOLTAGE (120.0 VAC , 60Hz) TO THE TEST SAMPLE.

INSTRUMENTS:		Calibration Due:
	CHROMA PROGRAMMABLE AC POWER SOURCE MODEL 61602	N/A
	CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202	3/9/16
	OCEAN OPTICS QE65PRO Spectroradiometer	8/21/16
	RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	8/21/16

OBJECT OF TEST: Measure the 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. Report Off-State Power.

PROCEDURE: The test sample was provided by the customer and had an unknown number of burn hours. The test sample was mounted inside the integrating sphere 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 120.0 VAC input in a 25 +/-1 degree Celsius free air ambient and in accordance with IESNA LM-79-08. 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:

SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4347
Chromaticity Ordinate y	0.4027
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2497
Chromaticity Ordinate v'	0.5205
Correlated Color Temp CCT (K)	3027
Color Rendering Index (CRIa)	92
Color Rendering Index 1 (Light greyish red)	92
Color Rendering Index 2 (Dark greyish yellow)	95
Color Rendering Index 3 (Strong yellowish green)	96
Color Rendering Index 4 (Moderate yellowish green)	92
Color Rendering Index 5 (Light bluish green)	92
Color Rendering Index 6 (Light blue)	94
Color Rendering Index 7 (Light violet)	93
Color Rendering Index 8 (Light reddish purple)	82
Color Rendering Index 9 (Strong red)	59
Color Rendering Index 10 (Strong yellow)	87
Color Rendering Index 11 (Strong green)	92
Color Rendering Index 12 (Strong blue)	81
Color Rendering Index 13 (Light yellowish pink (skin))	93
Color Rendering Index 14 (Moderate olive green (leaf))	97
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	1811 *
ELECTRICAL FOR SPECTRORADIOMETRIC TEST	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.071
Input Power (Watts)	8.31
Input Power Factor (%)	97.5
Input Current THD (%)	18.9
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

*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: RAB01222 Page 3 of 4
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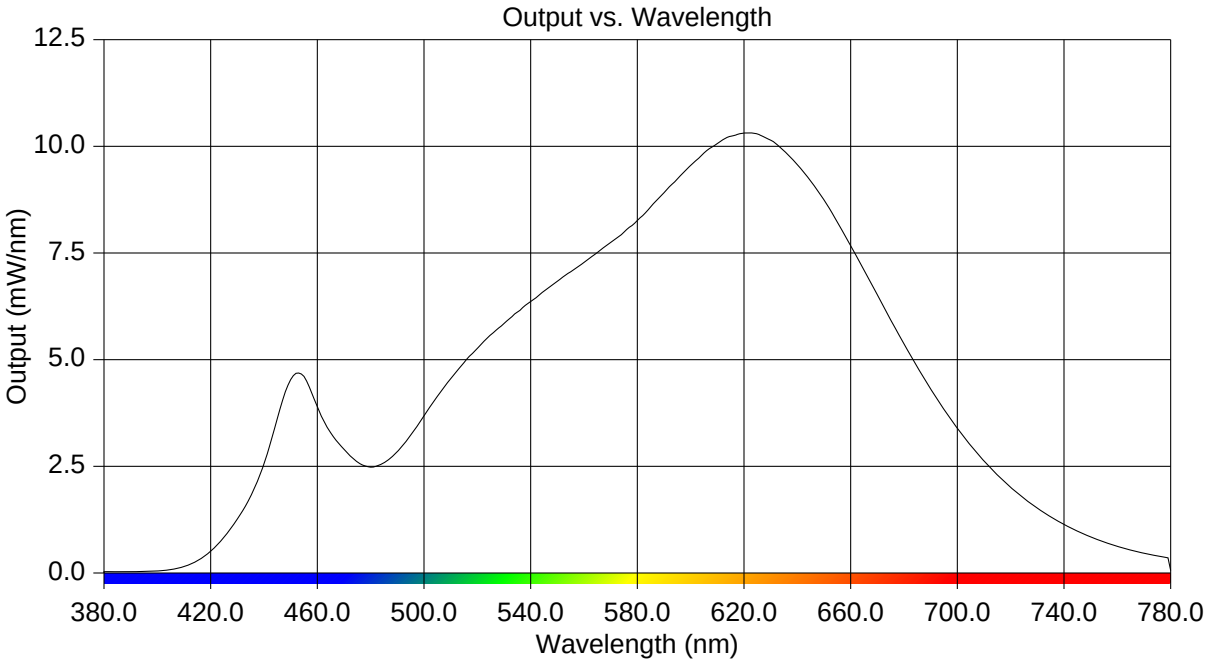
CATALOG NUMBER: RDLED2S8-30YHC-TW (2" Square recessed downlight - medium beam - >90 High CRI)

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.030	515	4.930	650	8.741
385	0.029	520	5.260	655	8.226
390	0.030	525	5.581	660	7.677
395	0.037	530	5.847	665	7.101
400	0.049	535	6.114	670	6.522
405	0.081	540	6.363	675	5.932
410	0.152	545	6.612	680	5.368
415	0.286	550	6.839	685	4.819
420	0.511	555	7.059	690	4.308
425	0.840	560	7.280	695	3.840
430	1.265	565	7.511	700	3.394
435	1.803	570	7.743	705	2.994
440	2.558	575	7.989	710	2.627
445	3.622	580	8.262	715	2.300
450	4.532	585	8.579	720	2.007
455	4.608	590	8.912	725	1.748
460	3.892	595	9.235	730	1.516
465	3.287	600	9.554	735	1.311
470	2.898	605	9.844	740	1.135
475	2.604	610	10.067	745	0.982
480	2.480	615	10.235	750	0.845
485	2.580	620	10.309	755	0.730
490	2.847	625	10.292	760	0.631
495	3.228	630	10.144	765	0.542
500	3.684	635	9.895	770	0.465
505	4.140	640	9.573	775	0.401
510	4.553	645	9.179	780	0.059



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CIE Chromaticity Diagram