Indoor Distribution Test Report

Spectrum Lighting Inc.

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Spectrum Lighting Photometric Lab

Luminaire

ES03RMFxx 930 013 xxx DL NF GP MW

Nom 3 inch diam round recessed estimator downlight

Test Number

SP-00868

Test Date

The results contained in this report pertain only to this IES file.

Summary of Results

Power

Input Watts	14.5 W

Lumen Output

Output Lumens	1009
Efficacy	69.56 lm/W

Luminous Dimensions

0° - 180° Size	-0.22
90° - 270° Size	-0.22
Height	0

Spacing Criterion

Two luminaires, plane 0°	0.45
Two luminaires, plane 90°	0.43
Four luminaires	0.47

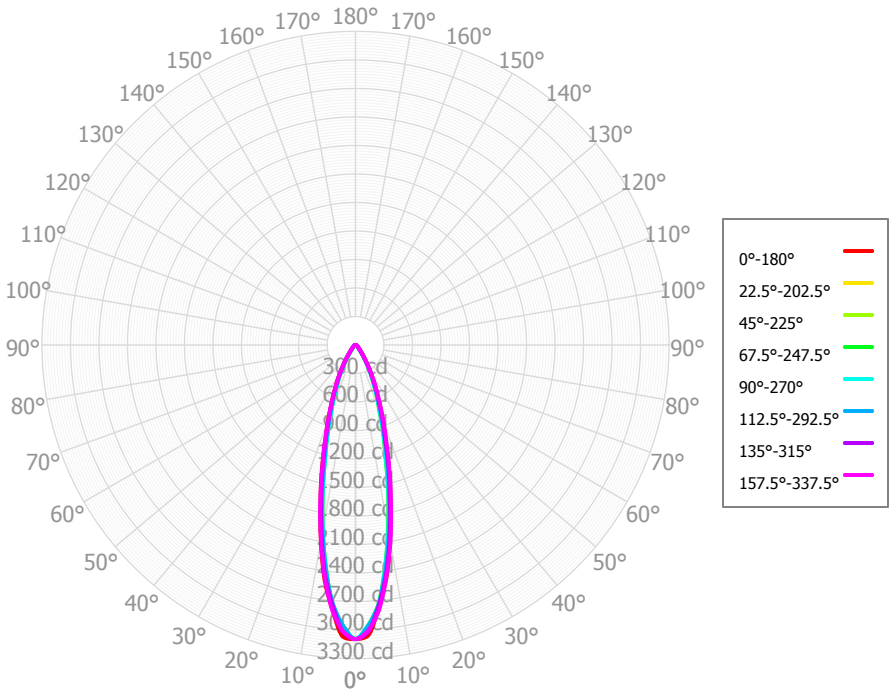
Full Beam Angle

0° - 180°	27°
90° - 270°	26°

IES File Header Contents

Keyword	Value
TEST	SP-00868
TESTLAB	Spectrum Lighting Photometric Lab, VLS-245-981
MANUFAC	Spectrum Lighting
ISSUEDATE	6/6/2019
UPDATE	7/25/2019
LUMCAT	ES03RMFxx 930 013 xxx DL NF GP MW
LUMINAIRE	Nom 3 inch diam round recessed estimator downlight
LAMPCAT	N/A
LAMP	N/A; CRI: 90
OTHER	Beam Angle: 27.3 degrees
OTHER	CCT Output Multipliers: 27HK x 0.97
OTHER	This report prepared by Spectrum Lighting
_CRI	90
_CCTMULT	27HK x 0.97
_LAMPMULT	7L x 0.49

Candela Polar Plot



Zonal Lumen Summary

Zone	Lumens	% Fixture	Zone	Lumens	% Fixture
0.00° - 10.00°	241.83	23.98%	90.00° - 100.00°	0.08	0.01%
10.00° - 20.00°	359.34	35.63%	100.00° - 110.00°	0.00	0.00%
20.00° - 30.00°	224.40	22.25%	100.00° - 120.00°	0.00	0.00%
30.00° - 40.00°	94.62	9.38%	120.00° - 130.00°	0.00	0.00%
40.00° - 50.00°	38.22	3.79%	130.00° - 140.00°	0.00	0.00%
50.00° - 60.00°	23.64	2.34%	140.00° - 150.00°	0.00	0.00%
60.00° - 70.00°	16.75	1.66%	150.00° - 160.00°	0.00	0.00%
70.00° - 80.00°	8.08	0.80%	160.00° - 170.00°	0.00	0.00%
80.00° - 90.00°	1.68	0.17%	170.00° - 180.00°	0.00	0.00%
0.00° - 90.00°	1,008.55	99.99%	0.00° - 180.00°	1,008.63	100.00%

Candela Distribution

	0.00°	22.50°	45.00°	67.50°	90.00°	112.50°	135.00°	157.50°	180.00°	202.50°	225.00°	247.50°	270.00°	292.50°	315.00°	337.50°	360.00°
0.00°	3,094.97	3,094.97	3,094.97	3,094.97	3,094.97	3,094.97	3,094.97	3,094.97	3,094.97	3,094.97	3,094.97	3,094.97	3,094.97	3,094.97	3,094.97	3,094.97	3,094.97
2.50°	3,060.56	3,008.04	2,979.29	2,961.30	2,963.75	2,962.07	3,023.54	3,018.09	3,072.01	3,003.50	2,969.23	2,963.27	2,964.68	2,964.64	3,024.92	3,012.29	3,060.56
5.00°	2,780.30	2,795.73	2,773.69	2,746.25	2,774.26	2,735.44	2,756.05	2,802.64	2,793.68	2,770.28	2,741.21	2,761.19	2,778.15	2,755.63	2,767.08	2,808.76	2,780.30
7.50°	2,479.83	2,443.33	2,406.04	2,372.38	2,381.03	2,392.55	2,447.88	2,473.15	2,492.51	2,431.08	2,384.72	2,376.46	2,381.35	2,398.16	2,448.32	2,471.53	2,479.83
10.00°	2,085.67	2,066.95	2,021.93	1,965.90	1,988.49	1,996.45	2,052.42	2,087.42	2,095.99	2,032.24	1,982.19	1,987.44	1,985.48	2,024.56	2,067.91	2,110.27	2,085.67
12.50°	1,703.94	1,667.63	1,614.59	1,587.82	1,601.06	1,626.14	1,676.41	1,715.31	1,698.73	1,658.63	1,609.15	1,589.33	1,600.84	1,632.37	1,675.14	1,723.11	1,703.94
15.00°	1,363.87	1,324.94	1,266.04	1,213.54	1,236.66	1,264.96	1,333.42	1,348.61	1,370.01	1,296.21	1,244.36	1,240.54	1,232.89	1,293.17	1,351.53	1,384.27	1,363.87
17.50°	1,056.38	1,026.06	984.42	965.73	982.33	1,006.98	1,043.11	1,073.68	1,049.98	1,026.87	989.75	974.28	977.66	1,004.77	1,037.47	1,087.61	1,056.38
20.00°	834.52	800.84	764.34	727.74	751.53	776.18	824.56	826.47	842.21	790.55	757.00	752.83	741.77	782.09	832.84	854.91	834.52
22.50°	640.77	622.85	601.00	587.49	601.47	619.23	644.38	656.18	644.29	626.60	604.17	593.35	593.02	610.37	636.27	667.28	640.77
25.00°	504.51	487.73	470.39	450.57	464.32	476.65	507.65	502.69	515.59	481.77	461.51	457.82	454.89	474.89	507.14	519.48	504.51
27.50°	384.39	374.49	364.91	354.33	361.89	370.27	390.82	390.84	393.18	373.75	356.41	349.04	352.15	362.01	380.19	394.85	384.39
30.00°	290.51	284.22	275.21	260.29	268.19	268.38	292.24	285.42	300.00	272.56	254.02	257.72	258.51	271.10	289.12	297.20	290.51
32.50°	212.10	203.12	195.23	191.96	192.73	200.58	213.92	214.97	215.03	203.54	188.38	182.20	188.26	191.25	201.41	211.98	212.10
35.00°	154.48	149.21	140.63	128.44	132.54	134.87	150.62	147.60	158.72	138.52	124.64	128.69	130.46	139.00	151.16	157.21	154.48
37.50°	111.21	103.87	98.46	96.72	97.61	101.62	108.75	113.54	110.60	105.09	95.14	91.74	97.63	97.79	104.58	113.26	111.21
40.00°	83.51	79.39	74.22	68.33	70.77	69.61	80.02	80.75	83.99	73.59	67.02	68.29	71.37	74.57	81.47	86.69	83.51
42.50°	63.75	59.70	57.06	54.72	54.99	57.52	61.81	65.85	62.00	59.40	54.06	52.99	55.61	56.80	60.94	64.92	63.75
45.00°	50.98	49.62	46.24	42.79	43.74	45.93	48.73	51.41	49.44	45.65	42.08	43.39	43.57	46.19	52.04	53.14	50.98
47.50°	41.93	41.04	37.33	36.48	37.48	39.22	40.47	43.17	39.38	39.26	36.35	36.53	36.46	37.16	43.86	43.31	41.93
50.00°	35.52	35.81	32.52	31.22	32.41	32.83	34.05	35.33	33.51	33.07	31.00	31.95	30.79	32.75	38.05	37.55	35.52
52.50°	30.86	30.90	28.61	28.61	28.38	28.41	28.87	30.34	28.87	28.78	27.27	28.26	26.68	29.06	32.52	32.30	30.86
55.00°	27.21	27.50	26.21	25.88	25.98	24.37	24.04	25.86	25.90	24.73	23.92	25.59	23.91	26.10	27.70	29.41	27.21
57.50°	24.20	24.18	24.03	22.93	24.78	21.99	22.11	23.85	23.10	22.08	21.76	23.22	22.31	23.20	24.00	26.68	24.20
60.00°	21.49	22.16	21.87	20.79	22.53	19.77	20.81	21.88	20.48	19.58	20.12	20.18	20.50	20.71	22.58	22.86	21.49
62.50°	19.58	20.08	19.70	19.97	19.65	18.07	18.41	20.04	18.40	17.69	19.75	16.99	18.54	18.25	20.78	19.16	19.58
65.00°	17.97	17.40	17.95	18.69	17.26	16.38	15.85	18.00	16.80	15.96	18.23	14.96	16.19	16.46	18.37	17.68	17.97
67.50°	14.97	14.61	16.08	16.82	15.11	14.73	13.89	15.43	14.24	14.74	14.54	13.11	13.61	14.42	15.56	15.96	14.97
70.00°	11.89	11.44	13.11	14.09	12.94	12.52	11.94	12.76	10.99	12.69	11.53	11.64	12.08	11.17	12.37	13.32	11.89
72.50°	10.37	8.93	10.38	10.77	10.77	9.49	9.43	9.90	9.42	9.19	9.27	9.85	10.69	8.63	10.12	10.62	10.37
75.00°	7.79	7.04	8.03	8.47	8.50	7.22	7.22	7.66	8.33	7.38	6.66	7.07	8.17	6.84	7.85	7.84	7.79
77.50°	4.74	6.32	5.58	6.04	5.96	5.28	5.50	5.80	5.96	6.32	4.38	5.24	5.26	4.89	4.90	4.85	4.74
80.00°	3.47	3.69	3.32	3.47	3.35	3.27	3.84	3.91	3.90	3.53	3.24	3.55	2.56	2.67	2.80	2.32	3.47
82.50°	1.47	1.79	1.56	1.53	1.87	1.89	2.30	2.47	2.38	1.97	1.80	1.46	1.19	1.32	1.51	1.61	1.47
85.00°	1.01	1.56	1.02	1.62	1.05	1.16	1.45	1.48	1.70	1.40	1.32	0.77	1.45	1.12	1.24	1.58	1.01
87.50°	1.14	1.00	0.99	1.14	1.23	1.06	1.20	1.12	1.39	1.58	1.00	0.94	1.26	0.99	1.35	1.25	1.14
90.00°	0.00	0.00	0.00	0.00	1.21	1.22	1.10	1.29	1.18	1.04	1.20	0.96	0.00	0.00	0.00	0.00	0.00
92.50°	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95.00°	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
97.50°	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00°	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
102.50°	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105.00°	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
107.50°	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110.00°	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112.50°	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Coefficients of Utilization – Zonal Cavity Method

Values are lumens delivered to the workplane.

	ρfc	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	0%
	ρcc	80%	80%	80%	80%	70%	70%	70%	70%	50%	50%	50%	30%	30%	30%	10%	10%	10%	0%
	ρw	70%	50%	30%	10%	70%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	30%
	0	1,201	1,201	1,201	1,201	1,173	1,173	1,173	1,173	1,121	1,121	1,121	1,073	1,073	1,073	1,029	1,029	1,029	1,009
	1	1,149	1,123	1,099	1,078	1,124	1,101	1,080	1,061	1,060	1,044	1,028	1,023	1,010	998	989	978	969	959
	2	1,098	1,053	1,016	984	1,077	1,036	1,002	973	1,004	976	952	974	952	932	947	929	912	910
	3	1,051	993	947	911	1,032	979	937	904	953	918	890	929	900	876	907	883	862	866
	4	1,007	940	890	852	990	928	882	847	907	868	837	888	854	827	870	841	818	826
RCR	5	967	892	841	802	951	883	835	799	866	824	792	850	813	785	835	803	778	789
	6	929	850	798	760	915	843	793	757	828	785	752	815	777	747	802	769	743	756
	7	894	813	760	723	881	806	757	721	794	750	718	783	743	714	772	737	710	725
	8	861	778	726	691	850	773	724	689	763	718	686	753	713	684	744	708	681	697
	9	831	747	696	662	821	743	694	660	734	689	658	726	685	656	718	681	654	671
	10	802	719	669	635	793	715	667	635	707	663	633	700	660	631	693	656	630	647

Cone of Light

Mtg Height	Light Level	Beam Diameter
5.5 ft	102.3 fc	2.6 ft
6.5 ft	73.3 fc	3.1 ft
7.5 ft	55.0 fc	3.5 ft
8.0 ft	48.4 fc	3.8 ft
10.0 ft	30.9 fc	4.7 ft
12.0 ft	21.5 fc	5.7 ft
14.0 ft	15.8 fc	6.6 ft
16.0 ft	12.1 fc	7.5 ft
20.0 ft	7.7 fc	9.4 ft
24.0 ft	5.4 fc	11.3 ft
28.0 ft	3.9 fc	13.2 ft

Average Luminaire Luminance [cd/m²]

	0.00°	45.00°	90.00°
0.00°	876,377	876,377	876,377
45.00°	20,415	18,517	17,514
55.00°	13,434	12,940	12,825
65.00°	12,039	12,025	11,565
75.00°	8,518	8,780	9,300
85.00°	3,288	3,325	3,416

UGR CIE 190:2010

Ceiling reflectance		0.7	0.7	0.5	0.5	0.3	0.7	0.7	0.5	0.5	0.3
Wall reflectance		0.5	0.3	0.5	0.3	0.3	0.5	0.3	0.5	0.3	0.3
Plane reflectance		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Room dimensions		Viewed crosswise					Viewed endwise				
2H	2H	14.5	15.5	14.9	15.9	16.2	13.8	14.8	14.2	15.2	15.5
	3H	15.9	16.8	16.3	17.2	17.5	15.4	16.3	15.8	16.6	17.0
	4H	16.4	17.2	16.8	17.5	17.9	15.9	16.8	16.4	17.1	17.5
	6H	16.5	17.3	16.9	17.6	18.0	16.1	16.9	16.6	17.3	17.7
	8H	16.5	17.2	16.9	17.6	18.0	16.1	16.8	16.6	17.2	17.6
	12H	16.5	17.1	16.9	17.5	18.0	16.1	16.8	16.6	17.2	17.6
4H	2H	15.0	15.8	15.4	16.2	16.6	14.4	15.2	14.8	15.6	15.9
	3H	16.6	17.3	17.0	17.7	18.1	16.1	16.8	16.5	17.2	17.6
	4H	17.1	17.7	17.5	18.1	18.5	16.7	17.3	17.1	17.7	18.1
	6H	17.3	17.8	17.7	18.2	18.7	16.9	17.4	17.4	17.9	18.4
	8H	17.3	17.7	17.7	18.2	18.7	16.9	17.4	17.4	17.9	18.3
	12H	17.2	17.7	17.7	18.2	18.6	16.9	17.3	17.4	17.8	18.3
8H	4H	17.2	17.7	17.7	18.1	18.6	16.8	17.2	17.2	17.7	18.2
	6H	17.4	17.8	17.9	18.3	18.8	17.1	17.5	17.6	18.0	18.5
	8H	17.4	17.8	18.0	18.3	18.8	17.1	17.5	17.7	18.0	18.5
	12H	17.5	17.8	18.0	18.3	18.8	17.1	17.4	17.7	17.9	18.5
12H	4H	17.1	17.5	17.6	18.0	18.5	16.7	17.2	17.2	17.6	18.1
	6H	17.4	17.7	17.9	18.2	18.7	17.1	17.4	17.6	17.9	18.4
	8H	17.4	17.7	18.0	18.2	18.8	17.1	17.4	17.7	17.9	18.5

Corrected UGR values based on total output lumens

SHR = 1.0