Indoor Distribution Test Report

Spectrum Lighting Inc.

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Spectrum Lighting Photometric Lab

Luminaire

ES03RMFxx 930 013 xxx DL SP GP MW

Nom 3 inch diam round recessed estimator downlight

Test Number

SP-00869

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	1001
Efficacy	69.05 lm/W

Luminous Dimensions

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

Spacing Criterion

Two luminaires, plane 0°	0.37
Two luminaires, plane 90°	0.34
Four luminaires	0.41

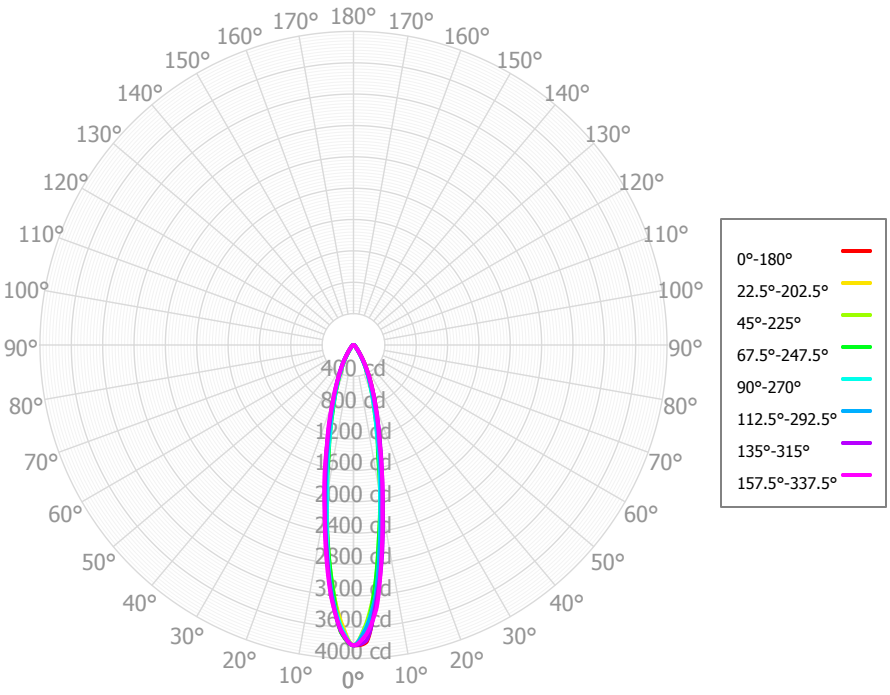
Full Beam Angle

0° - 180°	22°
90° - 270°	20°

IES File Header Contents

Keyword	Value
TEST	SP-00869
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 SP GP MW
LUMINAIRE	Nom 3 inch diam round recessed estimator downlight
LAMPCAT	N/A
LAMP	N/A; CRI: 90
OTHER	Beam Angle: 22.0 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°	267.25	26.69%	90.00° - 100.00°	0.07	0.01%
10.00° - 20.00°	343.25	34.28%	100.00° - 110.00°	0.00	0.00%
20.00° - 30.00°	212.86	21.26%	100.00° - 120.00°	0.00	0.00%
30.00° - 40.00°	93.51	9.34%	120.00° - 130.00°	0.00	0.00%
40.00° - 50.00°	38.15	3.81%	130.00° - 140.00°	0.00	0.00%
50.00° - 60.00°	22.55	2.25%	140.00° - 150.00°	0.00	0.00%
60.00° - 70.00°	14.81	1.48%	150.00° - 160.00°	0.00	0.00%
70.00° - 80.00°	7.21	0.72%	160.00° - 170.00°	0.00	0.00%
80.00° - 90.00°	1.61	0.16%	170.00° - 180.00°	0.00	0.00%
0.00° - 90.00°	1,001.22	99.99%	0.00° - 180.00°	1,001.29	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°	3,831.85	3,831.85	3,831.85	3,831.85	3,831.85	3,831.85	3,831.85	3,831.85	3,831.85	3,831.85	3,831.85	3,831.85	3,831.85	3,831.85	3,831.85	3,831.85	3,831.85
2.50°	3,792.95	3,652.49	3,575.94	3,656.94	3,610.67	3,648.76	3,653.82	3,642.78	3,664.67	3,546.34	3,600.57	3,668.51	3,601.79	3,624.56	3,773.71	3,698.80	3,792.95
5.00°	3,248.90	3,172.43	3,121.87	3,113.02	3,225.29	3,186.10	3,223.69	3,239.19	3,145.89	3,117.96	3,077.26	3,090.46	3,191.11	3,228.66	3,302.65	3,373.19	3,248.90
7.50°	2,700.50	2,635.93	2,490.21	2,478.45	2,572.70	2,637.31	2,629.91	2,686.08	2,583.19	2,527.17	2,538.58	2,517.53	2,560.37	2,586.36	2,761.31	2,730.80	2,700.50
10.00°	2,128.97	2,042.32	1,967.12	1,956.02	1,948.07	2,044.90	2,115.27	2,120.16	2,097.41	2,017.82	1,979.31	1,962.51	1,925.78	2,027.14	2,153.14	2,123.11	2,128.97
12.50°	1,606.90	1,583.33	1,498.93	1,449.87	1,527.69	1,600.80	1,657.33	1,708.83	1,616.80	1,563.20	1,518.74	1,468.26	1,528.66	1,577.45	1,677.65	1,680.01	1,606.90
15.00°	1,294.19	1,245.42	1,181.47	1,160.92	1,136.29	1,221.25	1,298.09	1,305.57	1,287.16	1,215.16	1,173.87	1,151.78	1,137.90	1,217.87	1,314.32	1,277.53	1,294.19
17.50°	1,008.56	985.03	929.52	894.47	909.45	954.56	1,000.51	1,035.52	962.78	929.46	898.05	872.51	912.13	963.76	1,036.04	1,030.70	1,008.56
20.00°	818.65	785.69	743.98	723.72	699.89	730.44	776.58	769.10	761.96	719.47	694.19	687.00	692.47	754.38	820.69	805.50	818.65
22.50°	643.88	625.08	583.01	559.57	567.62	577.37	592.60	610.09	563.68	548.44	536.57	525.97	553.98	590.88	648.51	648.89	643.88
25.00°	513.72	491.14	463.55	453.00	444.79	446.85	460.96	453.96	448.47	426.13	421.20	417.66	420.07	456.82	504.61	504.42	513.72
27.50°	394.75	382.19	357.24	348.31	356.36	353.71	354.21	358.37	335.78	325.37	325.57	319.44	327.70	349.21	387.79	392.95	394.75
30.00°	303.69	288.45	273.45	270.38	272.64	270.61	271.34	265.18	261.69	248.21	245.71	239.95	239.35	259.58	286.41	292.02	303.69
32.50°	222.11	215.06	195.55	193.40	203.41	205.77	198.19	201.71	190.22	180.11	181.50	172.46	177.26	184.30	210.58	215.47	222.11
35.00°	161.05	152.43	144.71	144.89	143.34	144.92	148.13	141.65	143.91	134.78	128.39	124.63	120.60	132.66	147.53	152.08	161.05
37.50°	111.72	111.05	99.59	98.02	107.05	108.89	106.03	109.77	100.70	96.82	94.14	87.97	91.37	97.52	108.19	114.79	111.72
40.00°	84.31	79.33	76.33	76.87	76.86	77.09	81.57	80.21	79.48	75.22	71.54	67.25	65.30	73.88	79.03	83.83	84.31
42.50°	62.69	60.49	56.78	56.79	60.17	61.30	62.31	64.79	60.09	58.01	55.82	51.48	52.32	57.32	60.99	63.87	62.69
45.00°	50.46	46.73	46.75	47.08	46.28	47.62	50.57	50.76	50.55	47.64	43.79	41.97	41.12	46.22	47.02	48.47	50.46
47.50°	40.64	39.37	37.93	37.95	37.84	40.28	40.64	43.54	41.49	38.79	36.50	34.44	36.00	38.03	39.25	39.95	40.64
50.00°	34.27	34.15	31.50	32.72	31.47	33.52	35.04	36.80	34.51	33.11	31.44	29.11	31.29	31.99	33.42	33.17	34.27
52.50°	28.91	29.51	25.28	27.98	28.56	29.95	30.30	31.91	28.29	27.99	26.60	25.34	27.71	26.95	28.71	28.71	28.91
55.00°	24.81	25.04	23.62	25.84	25.74	26.55	26.99	27.22	24.76	25.25	21.85	23.11	24.00	23.98	24.29	24.90	24.81
57.50°	21.25	22.07	22.20	23.64	23.04	23.18	23.90	23.17	21.52	22.83	19.15	20.09	19.99	21.85	21.53	21.88	21.25
60.00°	18.30	19.44	19.74	21.19	20.74	19.83	21.47	19.73	19.09	19.82	17.15	16.41	16.51	18.93	19.12	19.32	18.30
62.50°	16.22	16.88	17.28	18.86	18.95	18.42	19.12	17.98	16.83	16.77	15.35	14.46	14.15	15.76	16.30	17.26	16.22
65.00°	14.99	14.33	15.83	16.95	17.16	16.98	16.99	16.14	14.96	13.92	13.61	13.81	12.21	13.47	13.42	15.36	14.99
67.50°	13.13	12.46	14.33	14.64	15.38	15.04	14.88	14.07	13.11	11.15	11.38	11.53	10.92	11.41	11.62	13.61	13.13
70.00°	10.85	10.71	12.31	11.29	13.29	13.26	11.90	12.12	11.31	10.41	9.05	8.38	8.85	9.08	9.67	10.59	10.85
72.50°	8.35	9.35	10.48	9.27	10.94	12.53	9.19	10.32	9.31	9.20	7.01	7.10	6.24	6.88	6.84	7.33	8.35
75.00°	5.91	7.27	9.02	8.67	8.58	10.52	7.75	8.40	7.14	6.65	5.38	5.61	4.58	4.93	4.89	5.66	5.91
77.50°	3.77	4.44	6.21	6.03	6.42	6.42	5.69	6.39	4.93	4.30	4.35	3.03	2.81	3.80	3.67	4.09	3.77
80.00°	2.64	2.77	3.74	3.62	5.06	4.31	3.26	4.18	3.00	2.41	2.56	2.14	1.54	2.36	3.01	2.41	2.64
82.50°	1.48	1.26	2.60	2.15	2.67	2.63	2.17	2.51	1.70	1.48	1.28	1.45	1.38	1.29	1.25	1.15	1.48
85.00°	0.98	1.06	1.06	1.51	1.45	1.25	1.24	1.28	1.58	1.09	1.63	1.24	1.09	1.30	0.92	1.25	0.98
87.50°	1.18	1.11	1.34	0.87	1.34	0.88	1.02	0.93	1.61	1.04	0.93	1.30	1.39	0.50	1.25	0.71	1.18
90.00°	0.00	0.00	1.31	0.98	1.10	0.70	1.02	0.90	1.11	1.18	0.00	0.00	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	1,192	1,192	1,192	1,192	1,164	1,164	1,164	1,164	1,113	1,113	1,113	1,065	1,065	1,065	1,022	1,022	1,022	1,001
	1	1,142	1,116	1,093	1,072	1,117	1,095	1,074	1,055	1,054	1,038	1,023	1,017	1,004	993	983	973	964	954
	2	1,093	1,049	1,012	982	1,071	1,032	999	971	1,000	973	950	970	949	929	943	926	910	908
	3	1,047	990	946	911	1,028	976	936	903	951	917	889	927	899	875	905	882	862	865
	4	1,005	938	890	853	988	927	883	848	907	868	838	887	855	829	869	842	819	827
RCR	5	965	893	842	805	950	884	837	802	867	826	795	851	816	788	836	806	781	791
	6	929	852	801	764	915	845	797	762	831	788	757	817	780	752	805	772	747	759
	7	895	816	764	729	882	809	761	727	797	754	723	786	748	719	776	742	716	730
	8	863	783	732	697	852	777	729	696	767	724	693	758	719	690	749	714	688	703
	9	833	752	703	669	824	748	701	668	739	696	666	731	692	664	724	688	662	678
	10	806	725	676	644	797	721	675	643	714	671	642	707	668	640	700	664	638	655

Cone of Light

Mtg Height	Light Level	Beam Diameter
5.5 ft	126.7 fc	2.1 ft
6.5 ft	90.7 fc	2.4 ft
7.5 ft	68.1 fc	2.8 ft
8.0 ft	59.9 fc	3.0 ft
10.0 ft	38.3 fc	3.7 ft
12.0 ft	26.6 fc	4.5 ft
14.0 ft	19.6 fc	5.2 ft
16.0 ft	15.0 fc	6.0 ft
20.0 ft	9.6 fc	7.5 ft
24.0 ft	6.7 fc	9.0 ft
28.0 ft	4.9 fc	10.5 ft

Average Luminaire Luminance [cd/m²]

	0.00°	45.00°	90.00°
0.00°	1,085,034	1,085,034	1,085,034
45.00°	20,207	18,722	18,534
55.00°	12,249	11,660	12,709
65.00°	10,042	10,610	11,498
75.00°	6,462	9,872	9,390
85.00°	3,184	3,438	4,721

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	13.6	14.6	13.9	14.9	15.2	13.5	14.5	13.9	14.8	15.1
	3H	15.0	15.9	15.4	16.2	16.6	15.0	15.9	15.4	16.2	16.6
	4H	15.4	16.2	15.8	16.5	16.9	15.5	16.4	15.9	16.7	17.1
	6H	15.4	16.2	15.9	16.6	17.0	15.8	16.5	16.2	16.9	17.3
	8H	15.4	16.1	15.9	16.5	16.9	15.8	16.5	16.2	16.9	17.3
	12H	15.4	16.1	15.8	16.5	16.9	15.8	16.5	16.2	16.8	17.3
4H	2H	14.0	14.8	14.4	15.1	15.5	14.0	14.8	14.4	15.1	15.5
	3H	15.6	16.2	16.0	16.6	17.1	15.7	16.3	16.1	16.7	17.2
	4H	16.0	16.6	16.5	17.0	17.5	16.3	16.9	16.8	17.4	17.8
	6H	16.2	16.7	16.6	17.1	17.6	16.6	17.1	17.1	17.6	18.1
	8H	16.2	16.6	16.6	17.1	17.6	16.7	17.1	17.1	17.6	18.1
	12H	16.1	16.6	16.6	17.0	17.5	16.7	17.1	17.2	17.6	18.1
8H	4H	16.1	16.6	16.6	17.1	17.5	16.4	16.9	16.9	17.4	17.8
	6H	16.4	16.7	16.9	17.2	17.7	16.8	17.2	17.3	17.7	18.2
	8H	16.4	16.7	16.9	17.2	17.7	16.9	17.2	17.4	17.7	18.2
	12H	16.4	16.7	16.9	17.2	17.8	16.9	17.2	17.5	17.7	18.3
12H	4H	16.1	16.5	16.6	17.0	17.5	16.4	16.8	16.9	17.3	17.8
	6H	16.3	16.7	16.9	17.1	17.7	16.8	17.1	17.3	17.6	18.1
	8H	16.4	16.7	16.9	17.2	17.7	16.9	17.2	17.4	17.7	18.2

Corrected UGR values based on total output lumens

SHR = 1.0