

## Indoor Distribution Test Report

# Spectrum Lighting Inc.

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## Spectrum Lighting Photometric Lab

### Luminaire

SP4SQES 20L 35KDX SR4ES SGxF  
Nom 4 inch square recessed downlight

### Test Number

SP-00834

### Test Date

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

### Summary of Results

#### Power

Input Watts	19.5 W
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#### Lumen Output

Output Lumens	1525
Efficacy	78.18 lm/W

#### Luminous Dimensions

0° - 180° Size	0.33
90° - 270° Size	0.33
Height	0

#### Spacing Criterion

Two luminaires, plane 0°	1.34
Two luminaires, plane 90°	1.34
Four luminaires	1.26

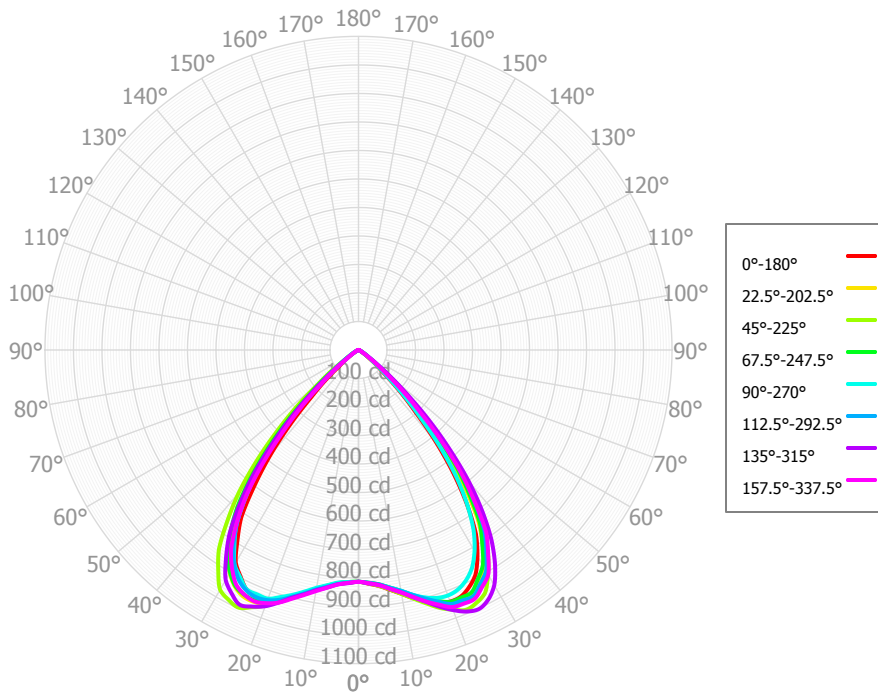
#### Full Beam Angle

0° - 180°	78°
90° - 270°	80°

### IES File Header Contents

Keyword	Value
TEST	SP-00834
TESTLAB	Spectrum Lighting Photometric Lab, VLS-245-981
MANUFAC	Spectrum Lighting
ISSUEDATE	1/15/2019
UPDATE	9/18/2019
LUMCAT	SP4SQES 20L 35KDX SR4ES SGxF
LUMINAIRE	Nom 4 inch square recessed downlight
OTHER	Soft glow trim, semi-diffuse clear anodized, open aperture
OTHER	Beam angle: 77 degrees
LAMPCAT	N/A, 3500K CCT
LAMP	N/A
OTHER	CCT Output Multipliers: 30K x 0.985, 40K x 1.03
OTHER	Total luminaire watts is approximate
OTHER	This report prepared by Spectrum Lighting
_CRI	80+
_CCTMULT	30K x 0.985, 40K x 1.03
_LAMPMULT	11L x 0.5, 15L x 0.65, 20L x 0.88

### Candela Polar Plot



### Zonal Lumen Summary

Zone	Lumens	% Fixture	Zone	Lumens	% Fixture
0.00° - 10.00°	81.22	5.33%	90.00° - 100.00°	0.09	0.01%
10.00° - 20.00°	257.63	16.90%	100.00° - 110.00°	0.00	0.00%
20.00° - 30.00°	433.11	28.41%	100.00° - 120.00°	0.00	0.00%
30.00° - 40.00°	459.08	30.11%	120.00° - 130.00°	0.00	0.00%
40.00° - 50.00°	235.16	15.43%	130.00° - 140.00°	0.00	0.00%
50.00° - 60.00°	46.15	3.03%	140.00° - 150.00°	0.00	0.00%
60.00° - 70.00°	8.43	0.55%	150.00° - 160.00°	0.00	0.00%
70.00° - 80.00°	2.42	0.16%	160.00° - 170.00°	0.00	0.00%
80.00° - 90.00°	1.23	0.08%	170.00° - 180.00°	0.00	0.00%
0.00° - 90.00°	1,524.42	99.99%	0.00° - 180.00°	1,524.51	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°	813.50	813.50	813.50	813.50	813.50	813.50	813.50	813.50	813.50	813.50	813.50	813.50	813.50	813.50	813.50	813.50	813.50
2.50°	820.90	818.54	819.78	817.29	818.80	817.20	818.79	817.75	817.53	816.61	814.95	815.06	814.90	817.68	819.72	819.14	820.90
5.00°	831.14	826.96	830.93	825.56	826.96	824.22	825.08	826.00	823.79	823.22	820.95	821.63	819.33	825.75	827.43	828.75	831.14
7.50°	848.42	845.44	847.56	840.66	840.78	837.23	840.48	841.07	837.61	837.77	833.52	834.99	832.21	841.26	844.86	844.92	848.42
10.00°	868.51	865.46	868.79	858.35	857.55	852.97	856.34	859.02	854.72	854.64	850.52	851.44	847.15	858.39	863.77	864.04	868.51
12.50°	892.00	889.91	893.72	881.08	879.87	874.27	877.89	880.31	876.40	877.41	872.04	872.06	867.68	880.27	888.70	887.90	892.00
15.00°	913.31	914.75	920.60	905.25	898.66	896.14	899.82	903.69	899.63	901.10	896.07	895.36	889.13	902.86	914.72	913.40	913.31
17.50°	932.49	936.28	948.73	923.37	912.14	918.94	928.85	929.11	918.03	926.69	924.24	921.64	908.89	925.58	944.01	936.91	932.49
20.00°	939.64	957.26	969.60	940.22	916.72	933.98	956.72	945.44	935.19	946.42	954.22	939.81	928.46	948.30	971.14	959.91	939.64
22.50°	937.02	954.57	986.65	940.48	910.22	938.79	974.56	954.62	933.29	956.66	976.86	950.63	928.35	951.35	993.20	963.52	937.02
25.00°	918.20	949.89	979.10	938.39	892.10	931.00	986.19	947.06	927.98	954.82	997.04	947.66	927.10	953.11	1,002.17	963.47	918.20
27.50°	888.79	919.28	961.22	906.63	862.29	909.61	963.50	928.90	896.19	937.23	987.88	934.55	899.12	925.46	986.74	938.45	888.79
30.00°	834.51	883.60	908.81	872.61	814.58	871.20	931.89	886.94	861.38	903.47	971.13	901.18	869.48	895.33	952.88	910.45	834.51
32.50°	767.26	812.13	845.32	808.87	752.28	817.68	865.16	832.59	790.36	852.20	915.91	855.67	810.30	834.43	891.58	846.50	767.26
35.00°	666.17	733.61	750.87	743.43	667.77	743.71	789.41	747.51	717.29	777.32	853.75	784.37	746.99	768.90	813.27	780.51	666.17
37.50°	550.79	620.65	648.98	641.00	568.23	655.09	687.31	649.87	599.53	681.71	755.53	700.64	648.70	669.41	713.94	668.08	550.79
40.00°	426.05	504.62	527.90	536.37	450.11	544.17	578.32	529.23	481.38	567.11	653.29	592.38	546.73	565.39	601.20	554.47	426.05
42.50°	298.28	377.83	403.56	406.61	321.96	420.23	453.58	401.43	356.01	439.03	531.22	474.93	424.65	439.67	475.05	423.32	298.28
45.00°	205.57	261.70	289.26	281.29	222.70	303.60	333.93	288.56	235.33	320.06	408.00	357.82	307.79	319.46	354.01	295.73	205.57
47.50°	121.16	173.67	175.97	185.79	135.72	190.40	223.64	179.23	158.10	206.40	293.14	240.82	211.31	218.20	237.12	201.16	121.16
50.00°	81.46	101.29	113.10	101.21	90.67	122.06	135.28	115.64	88.47	130.07	180.77	159.07	128.49	130.81	150.39	114.25	81.46
52.50°	49.39	62.05	52.75	66.86	59.79	70.03	79.02	59.42	61.83	71.01	114.90	84.77	85.22	80.77	83.91	73.30	49.39
55.00°	34.75	33.59	34.97	37.80	42.17	45.73	40.90	39.85	38.32	43.85	53.39	54.65	50.46	42.65	46.01	37.99	34.75
57.50°	21.89	23.23	17.94	26.27	27.86	29.14	24.51	23.74	27.38	28.11	32.83	30.64	34.99	29.43	23.43	25.87	21.89
60.00°	15.78	15.14	12.91	16.64	19.51	19.49	13.93	16.62	17.87	18.81	14.71	21.03	22.42	18.87	13.58	15.63	15.78
62.50°	9.96	10.11	8.17	11.98	12.20	11.24	9.06	9.93	12.68	11.31	10.60	12.60	15.12	12.69	9.09	11.07	9.96
65.00°	7.55	6.76	5.88	8.01	8.45	8.01	6.34	7.06	8.32	8.08	6.95	9.37	9.49	8.00	6.25	7.33	7.55
67.50°	5.23	5.24	3.92	5.35	5.13	5.43	5.28	4.40	5.81	5.70	5.02	6.36	6.19	5.30	3.94	5.50	5.23
70.00°	3.48	4.05	3.18	3.58	3.99	3.85	3.86	3.31	4.00	4.02	3.49	4.34	4.33	3.53	2.76	4.01	3.48
72.50°	2.33	3.07	2.46	2.69	2.93	2.56	2.30	2.47	3.01	2.66	2.64	2.85	3.59	2.46	1.89	2.92	2.33
75.00°	2.13	2.09	1.74	2.07	2.08	2.04	2.18	2.02	2.71	2.27	2.03	2.36	2.73	2.07	1.78	2.17	2.13
77.50°	1.87	1.48	1.50	1.71	1.54	1.76	1.68	1.98	2.35	1.81	1.58	1.81	2.05	1.65	1.52	1.73	1.87
80.00°	1.59	1.31	1.26	1.74	1.33	1.62	0.93	1.88	1.45	1.40	1.33	1.46	1.71	1.14	1.24	1.77	1.59
82.50°	1.40	1.02	1.07	1.51	1.33	1.53	0.80	1.56	1.12	1.15	1.20	1.34	1.27	1.31	1.14	1.88	1.40
85.00°	1.38	0.75	1.06	1.25	1.01	1.37	1.25	1.14	1.19	1.00	1.49	1.09	1.21	1.65	0.91	1.38	1.38
87.50°	1.06	0.92	1.13	0.94	0.67	0.95	1.04	0.91	0.92	0.95	0.93	1.01	1.14	1.15	1.05	1.00	1.06
90.00°	0.70	0.58	0.55	0.41	0.68	0.66	0.38	0.88	0.47	0.93	0.44	0.77	1.26	0.38	0.86	0.42	0.70
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.

<b>RCR</b>	<b>pfc</b>	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	0%
	<b>pcc</b>	80%	80%	80%	80%	70%	70%	70%	70%	50%	50%	50%	30%	30%	30%	10%	10%	0%
	<b>pw</b>	70%	50%	30%	10%	70%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	30%
	<b>0</b>	1,815	1,815	1,815	1,815	1,773	1,773	1,773	1,773	1,694	1,694	1,694	1,622	1,622	1,622	1,556	1,556	1,524
	<b>1</b>	1,717	1,670	1,627	1,589	1,679	1,637	1,598	1,563	1,574	1,543	1,515	1,517	1,492	1,469	1,464	1,445	1,416
	<b>2</b>	1,616	1,531	1,460	1,401	1,581	1,504	1,440	1,385	1,454	1,400	1,355	1,407	1,364	1,325	1,364	1,329	1,302
	<b>3</b>	1,517	1,404	1,316	1,247	1,485	1,382	1,301	1,236	1,341	1,272	1,216	1,302	1,245	1,197	1,267	1,219	1,178
	<b>4</b>	1,422	1,289	1,192	1,117	1,393	1,271	1,180	1,110	1,237	1,158	1,096	1,205	1,138	1,083	1,175	1,118	1,070
	<b>5</b>	1,334	1,186	1,083	1,007	1,307	1,171	1,074	1,002	1,142	1,057	992	1,115	1,041	983	1,090	1,026	974
	<b>6</b>	1,251	1,093	988	912	1,226	1,081	981	908	1,056	968	902	1,033	955	895	1,012	943	889
	<b>7</b>	1,174	1,010	904	830	1,152	1,000	899	827	979	888	822	959	878	818	941	868	813
	<b>8</b>	1,104	936	831	758	1,083	927	826	756	909	818	753	892	809	749	876	801	746
	<b>9</b>	1,039	869	766	695	1,020	861	762	694	846	755	691	831	748	689	817	742	686
	<b>10</b>	979	810	708	640	962	802	705	639	789	699	637	776	693	635	764	688	633

### Cone of Light

Mtg Height	Light Level	Beam Diameter
5.5 ft	26.9 fc	8.9 ft
6.5 ft	19.3 fc	10.5 ft
7.5 ft	14.5 fc	12.2 ft
8.0 ft	12.7 fc	13.0 ft
10.0 ft	8.1 fc	16.2 ft
12.0 ft	5.6 fc	19.5 ft
14.0 ft	4.2 fc	22.7 ft
16.0 ft	3.2 fc	26.0 ft
20.0 ft	2.0 fc	32.4 ft
24.0 ft	1.4 fc	38.9 ft
28.0 ft	1.0 fc	45.4 ft

### Average Luminaire Luminance [cd/m²]

	0.00°	45.00°	90.00°
<b>0.00°</b>	80,408	80,408	80,408
<b>45.00°</b>	28,735	40,433	31,130
<b>55.00°</b>	5,988	6,026	7,267
<b>65.00°</b>	1,767	1,376	1,975
<b>75.00°</b>	813	666	794
<b>85.00°</b>	1,563	1,206	1,147

### UGR CIE 190:2010

<b>Ceiling reflectance</b>		<b>0.7</b>	<b>0.7</b>	<b>0.5</b>	<b>0.5</b>	<b>0.3</b>	<b>0.7</b>	<b>0.7</b>	<b>0.5</b>	<b>0.5</b>	<b>0.3</b>
<b>Wall reflectance</b>		<b>0.5</b>	<b>0.3</b>	<b>0.5</b>	<b>0.3</b>	<b>0.3</b>	<b>0.5</b>	<b>0.3</b>	<b>0.5</b>	<b>0.3</b>	<b>0.3</b>
<b>Plane reflectance</b>		<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>
<b>Room dimensions</b>		<b>Viewed crosswise</b>					<b>Viewed endwise</b>				
<b>2H</b>	<b>2H</b>	9.7	10.8	10.0	11.1	11.4	11.3	12.4	11.6	12.7	13.0
	<b>3H</b>	9.8	10.8	10.1	11.1	11.5	11.3	12.3	11.7	12.6	13.0
	<b>4H</b>	9.7	10.7	10.1	11.0	11.4	11.3	12.2	11.7	12.5	12.9
	<b>6H</b>	9.7	10.6	10.1	10.9	11.3	11.2	12.0	11.6	12.4	12.8
	<b>8H</b>	9.7	10.5	10.1	10.9	11.3	11.2	12.0	11.6	12.4	12.8
	<b>12H</b>	9.7	10.5	10.2	10.9	11.3	11.2	11.9	11.6	12.3	12.7
<b>4H</b>	<b>2H</b>	9.5	10.5	9.9	10.8	11.2	11.1	12.0	11.5	12.4	12.8
	<b>3H</b>	9.7	10.4	10.1	10.8	11.2	11.2	11.9	11.6	12.3	12.7
	<b>4H</b>	9.7	10.3	10.1	10.8	11.2	11.1	11.8	11.6	12.2	12.7
	<b>6H</b>	9.7	10.3	10.2	10.7	11.2	11.1	11.7	11.6	12.1	12.6
	<b>8H</b>	9.7	10.2	10.2	10.7	11.2	11.1	11.6	11.6	12.1	12.5
	<b>12H</b>	9.8	10.2	10.3	10.7	11.2	11.1	11.6	11.6	12.0	12.5
<b>8H</b>	<b>4H</b>	9.5	10.1	10.0	10.5	11.0	11.0	11.5	11.5	12.0	12.5
	<b>6H</b>	9.6	10.0	10.1	10.5	11.0	11.0	11.4	11.5	11.9	12.4
	<b>8H</b>	9.7	10.0	10.2	10.6	11.1	11.0	11.4	11.5	11.9	12.4
	<b>12H</b>	9.8	10.1	10.3	10.6	11.2	11.1	11.4	11.6	11.9	12.5
<b>12H</b>	<b>4H</b>	9.5	10.0	10.0	10.4	10.9	11.0	11.4	11.4	11.9	12.4
	<b>6H</b>	9.6	9.9	10.1	10.4	11.0	10.9	11.3	11.5	11.8	12.3
	<b>8H</b>	9.6	10.0	10.2	10.5	11.1	11.0	11.3	11.5	11.8	12.4

Corrected UGR values based on total output lumens

SHR = 1.0