Indoor Distribution Test Report

Spectrum Lighting Inc.

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Spectrum Lighting Photometric Lab

Luminaire

SP4ES 20L 35K DX AR4WES MW

Nom. 4.5" Aperture, LED Wall Wash

Test Number

SP-00677_8

Test Date

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

Summary of Results

Power

Input Watts	19.5 W

Lumen Output

Output Lumens	1375
Efficacy	70.49 lm/W

Luminous Dimensions

0° - 180° Size	-0.38
90° - 270° Size	-0.38
Height	0

Spacing Criterion

Two luminaires, plane 0°	1.05
Two luminaires, plane 90°	0.93
Four luminaires	0.88

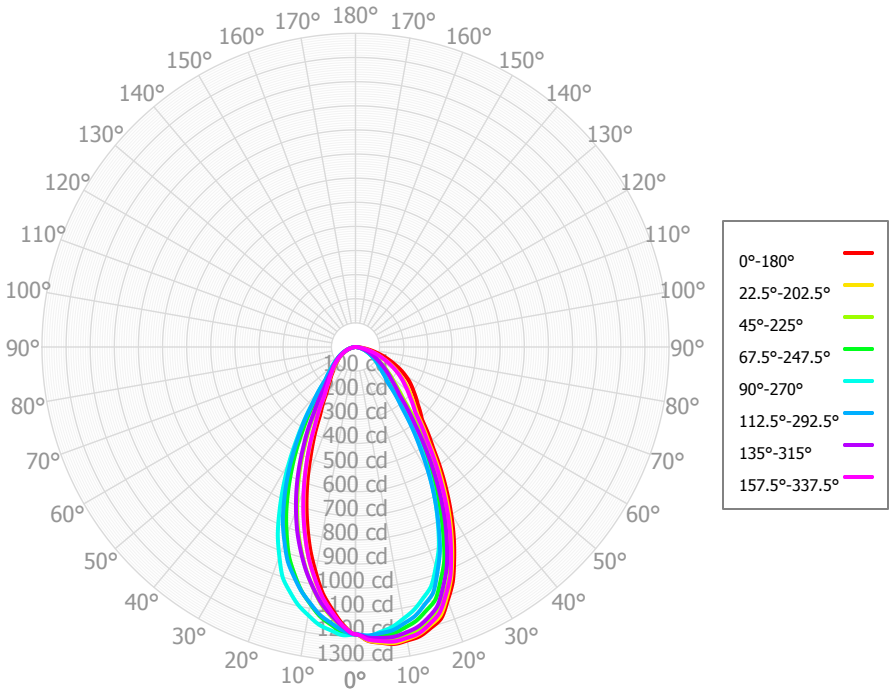
Full Beam Angle

0° - 180°	54°
90° - 270°	58°

IES File Header Contents

Keyword	Value
TEST	SP-00677_8
TESTLAB	Spectrum Lighting Photometric Lab, VLS-245-981
MANUFAC	Spectrum Lighting
ISSUEDATE	7/27/2018
UPDATE	9/19/2019
LUMCAT	SP4ES 20L 35K DX AR4WES MW
LUMINAIRE	Nom. 4.5" Aperture, LED Wall Wash
OTHER	Matte white trim, open aperture, 'kicker' peened reflector
OTHER	Any flange finish
LAMP	N/A
LAMPCAT	N/A, 3500K CCT
OTHER	Fully regressed lensed, light emitting surface
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 0.55, 15L x 0.75

Candela Polar Plot



Zonal Lumen Summary

Zone	Lumens	% Fixture	Zone	Lumens	% Fixture
0.00° - 10.00°	111.62	8.12%	90.00° - 100.00°	0.12	0.01%
10.00° - 20.00°	285.06	20.74%	100.00° - 110.00°	0.00	0.00%
20.00° - 30.00°	330.84	24.07%	100.00° - 120.00°	0.00	0.00%
30.00° - 40.00°	245.87	17.89%	120.00° - 130.00°	0.00	0.00%
40.00° - 50.00°	158.62	11.54%	130.00° - 140.00°	0.00	0.00%
50.00° - 60.00°	118.46	8.62%	140.00° - 150.00°	0.00	0.00%
60.00° - 70.00°	78.69	5.72%	150.00° - 160.00°	0.00	0.00%
70.00° - 80.00°	38.18	2.78%	160.00° - 170.00°	0.00	0.00%
80.00° - 90.00°	7.19	0.52%	170.00° - 180.00°	0.00	0.00%
0.00° - 90.00°	1,374.54	100.00%	0.00° - 180.00°	1,374.54	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°	1,191.38	1,191.38	1,191.38	1,191.38	1,191.38	1,191.38	1,191.38	1,191.38	1,191.38	1,191.38	1,191.38	1,191.38	1,191.38	1,191.38	1,191.38	1,191.38	1,191.38
2.50°	1,219.84	1,218.42	1,214.83	1,208.52	1,200.29	1,177.35	1,161.96	1,158.82	1,154.30	1,160.44	1,167.09	1,184.97	1,196.37	1,197.30	1,206.24	1,214.62	1,219.84
5.00°	1,231.40	1,230.01	1,222.52	1,204.23	1,185.88	1,149.68	1,119.98	1,105.02	1,094.13	1,107.78	1,124.56	1,156.38	1,179.27	1,191.24	1,210.72	1,224.19	1,231.40
7.50°	1,241.72	1,237.81	1,226.43	1,198.89	1,170.35	1,121.10	1,073.65	1,047.24	1,032.23	1,050.17	1,077.84	1,126.51	1,161.07	1,184.24	1,212.31	1,231.43	1,241.72
10.00°	1,235.93	1,230.57	1,216.09	1,181.40	1,144.08	1,079.40	1,012.79	972.87	948.79	974.70	1,013.97	1,081.63	1,129.08	1,163.54	1,202.49	1,225.08	1,235.93
12.50°	1,228.88	1,219.52	1,202.65	1,163.07	1,117.09	1,037.02	948.57	895.96	864.04	896.02	945.94	1,035.58	1,096.02	1,142.13	1,189.13	1,215.62	1,228.88
15.00°	1,206.37	1,195.62	1,177.55	1,131.82	1,079.57	985.79	876.35	808.16	769.94	805.99	870.20	975.88	1,050.92	1,106.13	1,162.42	1,189.02	1,206.37
17.50°	1,180.73	1,168.60	1,145.30	1,099.79	1,041.39	932.97	802.32	718.76	675.34	715.36	792.67	914.33	1,002.79	1,069.41	1,127.38	1,156.94	1,180.73
20.00°	1,118.40	1,106.45	1,087.25	1,031.60	972.79	860.62	721.39	626.82	579.64	622.65	708.67	833.06	923.32	993.00	1,060.96	1,094.66	1,118.40
22.50°	1,054.02	1,035.97	1,021.60	961.36	902.51	787.06	638.92	534.53	483.89	531.19	623.19	751.04	842.19	914.81	988.87	1,027.81	1,054.02
25.00°	967.94	949.71	929.61	862.43	809.13	699.43	554.35	448.08	400.93	443.90	537.39	661.77	743.88	815.10	896.33	937.10	967.94
27.50°	881.46	859.79	835.12	761.99	714.58	611.86	469.34	362.42	318.53	362.00	451.51	572.88	645.68	714.60	801.39	845.67	881.46
30.00°	790.85	767.45	731.95	654.18	615.02	525.01	393.19	300.11	269.45	298.03	377.24	487.68	548.42	609.39	698.15	750.64	790.85
32.50°	700.61	674.57	630.18	546.04	515.23	439.09	318.85	240.82	221.60	241.92	305.40	403.81	452.55	503.99	596.11	656.90	700.61
35.00°	613.91	587.07	533.06	448.05	424.27	362.67	263.39	211.00	197.02	210.90	251.41	331.83	368.77	409.84	498.23	569.57	613.91
37.50°	529.69	500.74	440.73	350.49	333.66	288.46	211.70	184.85	173.32	183.13	201.07	262.67	288.01	316.01	406.36	486.62	529.69
40.00°	467.65	438.36	363.73	279.83	267.02	235.76	182.50	166.32	156.66	165.34	174.93	216.93	233.78	255.53	334.54	424.26	467.65
42.50°	408.82	381.03	295.47	210.17	201.24	185.95	157.58	148.67	140.21	148.19	153.62	173.96	183.27	195.78	271.56	367.59	408.82
45.00°	378.83	347.72	255.11	181.00	174.11	162.13	141.90	135.41	128.13	133.00	137.91	153.95	162.91	172.21	236.83	336.48	378.83
47.50°	349.62	319.21	218.63	153.02	148.21	139.32	127.94	122.65	116.14	118.86	123.26	134.66	143.13	149.43	204.83	306.57	349.62
50.00°	326.95	293.75	194.05	136.43	132.19	125.66	115.69	111.11	104.70	107.81	111.55	121.05	127.94	134.03	181.62	282.02	326.95
52.50°	304.57	268.90	170.06	120.13	116.41	112.14	103.76	99.70	93.27	97.24	100.37	107.80	113.06	118.73	159.19	258.04	304.57
55.00°	284.43	245.38	147.81	106.48	104.50	99.87	94.14	89.42	85.64	88.08	90.43	97.35	100.63	106.56	139.18	236.46	284.43
57.50°	263.87	222.11	126.82	92.89	92.66	88.01	84.91	79.25	78.07	79.04	80.70	86.94	88.40	94.40	120.33	214.55	263.87
60.00°	240.13	197.89	109.51	81.43	81.84	79.25	74.66	70.52	68.16	70.37	71.24	76.91	77.64	82.36	104.97	191.23	240.13
62.50°	216.00	173.49	93.05	70.01	71.04	70.34	64.25	61.94	58.23	61.94	61.82	67.03	67.18	70.35	90.29	168.02	216.00
65.00°	189.14	148.09	78.95	60.36	61.12	60.24	56.06	54.02	50.86	54.16	53.87	58.19	58.73	61.52	77.63	145.18	189.14
67.50°	162.77	122.51	65.78	50.89	51.43	50.62	48.21	46.20	43.55	46.08	46.16	49.44	50.25	52.75	65.48	123.11	162.77
70.00°	138.16	102.16	54.43	43.22	44.17	42.85	40.43	39.91	36.66	37.45	38.62	41.02	41.66	44.52	54.35	102.99	138.16
72.50°	113.66	81.92	44.19	35.89	36.67	35.42	32.86	33.34	30.22	30.52	31.05	33.26	33.50	35.96	43.54	82.89	113.66
75.00°	89.31	61.45	34.76	29.17	28.70	28.36	25.91	26.09	24.56	24.77	23.37	26.23	25.82	26.84	32.98	62.82	89.31
77.50°	67.69	43.38	26.18	21.96	21.13	21.92	19.07	18.86	18.17	17.98	17.28	19.41	18.51	19.95	25.15	45.55	67.69
80.00°	47.33	27.77	16.88	14.43	14.60	14.49	13.02	12.92	12.15	12.19	11.93	12.25	12.77	14.01	17.62	29.62	47.33
82.50°	27.85	15.23	8.75	7.68	9.64	7.98	8.28	8.64	7.28	7.37	7.06	6.56	8.28	8.64	10.61	16.41	27.85
85.00°	10.63	5.67	4.02	4.16	5.44	4.98	3.99	4.18	4.11	3.69	3.87	4.06	3.87	4.20	4.81	6.89	10.63
87.50°	1.91	1.99	1.65	2.10	2.28	2.05	1.88	1.87	1.95	1.77	1.61	1.86	1.62	1.78	1.69	1.67	1.91
90.00°	0.74	1.01	0.64	0.72	0.75	0.89	1.39	1.07	1.03	0.63	0.85	1.08	1.08	0.68	0.98	0.62	0.74

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	1,636	1,636	1,636	1,636	1,598	1,598	1,598	1,598	1,527	1,527	1,527	1,462	1,462	1,462	1,403	1,403	1,403	1,375
	1	1,534	1,485	1,441	1,401	1,499	1,454	1,414	1,378	1,398	1,365	1,335	1,345	1,319	1,295	1,297	1,277	1,257	1,250
	2	1,432	1,345	1,274	1,214	1,399	1,320	1,255	1,200	1,274	1,220	1,173	1,231	1,186	1,147	1,192	1,155	1,122	1,131
	3	1,337	1,225	1,138	1,069	1,307	1,204	1,124	1,060	1,166	1,098	1,042	1,131	1,073	1,025	1,098	1,050	1,008	1,028
	4	1,251	1,121	1,026	954	1,223	1,105	1,016	948	1,073	996	936	1,043	977	924	1,016	960	913	940
RCR	5	1,173	1,032	934	861	1,148	1,018	926	856	992	910	848	967	896	840	944	882	832	865
	6	1,103	955	855	784	1,080	943	849	781	920	837	775	899	826	769	880	814	763	799
	7	1,039	887	788	719	1,019	877	783	717	858	774	713	840	765	708	823	756	704	742
	8	982	827	730	664	963	819	726	662	802	719	659	787	711	656	773	704	653	692
	9	929	775	680	616	912	767	677	615	753	670	612	740	664	610	727	658	608	648
	10	881	728	636	575	866	721	633	574	709	628	572	697	623	570	687	618	568	608

Cone of Light

Mtg Height	Light Level	Beam Diameter
5.5 ft	39.4 fc	5.7 ft
6.5 ft	28.2 fc	6.7 ft
7.5 ft	21.2 fc	7.8 ft
8.0 ft	18.6 fc	8.3 ft
10.0 ft	11.9 fc	10.4 ft
12.0 ft	8.3 fc	12.5 ft
14.0 ft	6.1 fc	14.5 ft
16.0 ft	4.7 fc	16.6 ft
20.0 ft	3.0 fc	20.8 ft
24.0 ft	2.1 fc	24.9 ft
28.0 ft	1.5 fc	29.1 ft

Average Luminaire Luminance [cd/m²]

	0.00°	45.00°	90.00°
0.00°	113,074	113,074	113,074
45.00°	50,847	34,242	23,369
55.00°	47,064	24,458	17,291
65.00°	42,477	17,730	13,725
75.00°	32,752	12,745	10,526
85.00°	11,576	4,378	5,923

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	24.6	25.9	24.9	26.2	26.5	18.0	19.3	18.4	19.6	19.9
	3H	26.2	27.3	26.6	27.7	28.0	19.4	20.5	19.7	20.9	21.2
	4H	26.7	27.8	27.1	28.2	28.6	19.8	20.9	20.2	21.3	21.6
	6H	27.1	28.1	27.5	28.4	28.8	20.1	21.1	20.5	21.4	21.8
	8H	27.1	28.1	27.6	28.5	28.9	20.1	21.1	20.5	21.4	21.9
	12H	27.2	28.1	27.6	28.4	28.9	20.1	21.0	20.6	21.4	21.8
4H	2H	24.5	25.6	24.9	26.0	26.3	18.4	19.4	18.8	19.8	20.2
	3H	26.3	27.2	26.7	27.6	28.0	19.9	20.8	20.4	21.2	21.6
	4H	27.0	27.8	27.4	28.2	28.7	20.5	21.3	20.9	21.7	22.2
	6H	27.4	28.1	27.9	28.6	29.0	20.9	21.5	21.3	22.0	22.5
	8H	27.5	28.2	28.0	28.6	29.1	20.9	21.6	21.4	22.0	22.5
	12H	27.5	28.1	28.0	28.6	29.1	20.9	21.5	21.4	22.0	22.5
8H	4H	26.9	27.6	27.4	28.0	28.5	20.6	21.3	21.1	21.7	22.2
	6H	27.4	27.9	27.9	28.4	28.9	21.0	21.6	21.5	22.1	22.5
	8H	27.5	28.0	28.1	28.5	29.0	21.1	21.6	21.7	22.1	22.6
	12H	27.6	28.0	28.1	28.5	29.1	21.2	21.6	21.7	22.1	22.7
12H	4H	26.9	27.5	27.4	28.0	28.4	20.6	21.2	21.1	21.7	22.1
	6H	27.4	27.8	27.9	28.3	28.9	21.0	21.5	21.6	22.0	22.5
	8H	27.5	27.9	28.0	28.4	29.0	21.2	21.6	21.7	22.1	22.6

Corrected UGR values based on total output lumens

SHR = 1.0