

Indoor Distribution Test Report

Spectrum Lighting Inc.

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Spectrum Lighting Photometric Lab

Luminaire

TSRA31 21L 35K ND E1 BET xx
Nominal 3.1" Diameter Track Spot Luminaire with Recessed Arm

Test Number

SP-15009_1

Test Date

9/15/2023

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

Summary of Results

Power

Input Watts	20 W
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Lumen Output

Output Lumens	2140
Efficacy	106.98 lm/W

Luminous Dimensions

0° - 180° Size	0.06
90° - 270° Size	0.06
Height	0.22

Spacing Criterion

Two luminaires, plane 0°	0.41
Two luminaires, plane 90°	0.41
Four luminaires	0.4

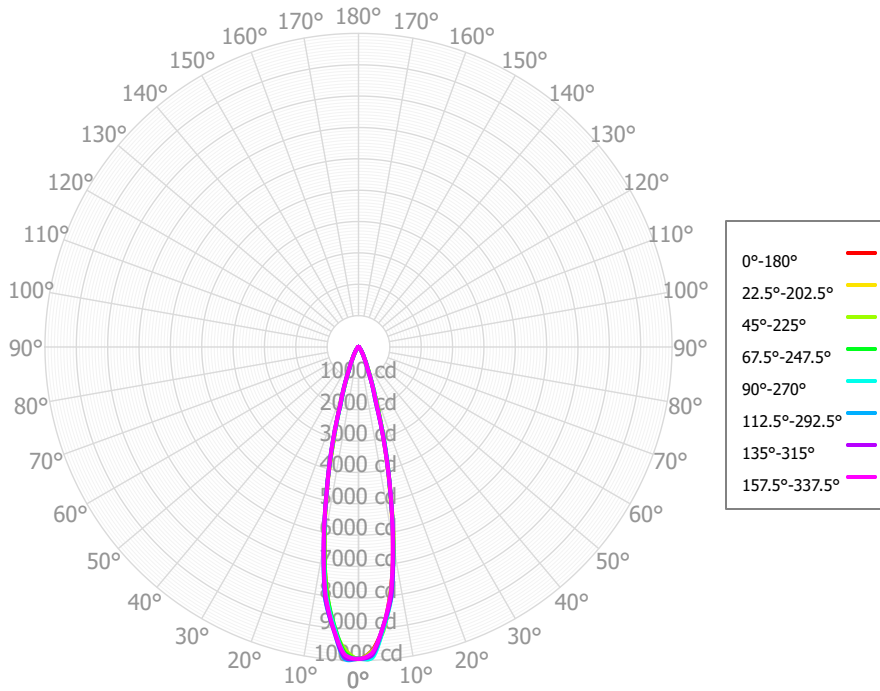
Full Beam Angle

0° - 180°	24°
90° - 270°	24°

IES File Header Contents

Keyword	Value
TEST	SP-15009_1
TESTLAB	Spectrum Lighting Potometric Lab, VLS-245-981
MANUFAC	Spectrum Lighting
TESTDATE	9/15/2023
ISSUEDATE	9/15/2023
LUMCAT	TSRA31 21L 35K ND E1 BET xx
LUMINAIRE	Nominal 3.1" Diameter Track Spot Luminaire with Recessed Arm
OTHER	Narrow Beam
OTHER	24 Degree Beam Angle
OTHER	This report prepared by Spectrum Lighting
_CRI	80+
_CCTMULT	30K x .93

Candela Polar Plot



Zonal Lumen Summary

Zone	Lumens	% Fixture	Zone	Lumens	% Fixture
0.00° - 10.00°	783.20	36.61%	90.00° - 100.00°	1.41	0.07%
10.00° - 20.00°	871.35	40.73%	100.00° - 110.00°	1.39	0.07%
20.00° - 30.00°	281.71	13.17%	100.00° - 120.00°	2.82	0.13%
30.00° - 40.00°	112.34	5.25%	120.00° - 130.00°	1.24	0.06%
40.00° - 50.00°	53.22	2.49%	130.00° - 140.00°	1.19	0.06%
50.00° - 60.00°	21.63	1.01%	140.00° - 150.00°	1.09	0.05%
60.00° - 70.00°	3.91	0.18%	150.00° - 160.00°	0.94	0.04%
70.00° - 80.00°	1.40	0.07%	160.00° - 170.00°	0.53	0.02%
80.00° - 90.00°	1.45	0.07%	170.00° - 180.00°	0.16	0.01%
0.00° - 90.00°	2130.21	99.56%	0.00° - 180.00°	2139.58	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°	9946.23	9946.23	9946.23	9946.23	9946.23	9946.23	9946.23	9946.23	9946.23	9946.23	9946.23	9946.23	9946.23	9946.23	9946.23	9946.23	9946.23
2.50°	9707.52	9876.48	9724.82	9869.62	9932.24	9970.08	9924.29	9828.70	9724.25	9849.90	9675.24	9768.27	9843.68	9857.81	9844.79	9773.94	9707.52
5.00°	9005.24	8963.22	9094.69	9035.04	9045.14	9059.84	9068.38	9045.13	9023.83	8949.70	9000.48	8900.89	8959.58	8959.49	8969.29	8964.54	9005.24
7.50°	7864.17	7987.29	7867.12	7999.69	8054.34	8129.22	8097.95	8013.63	7841.82	7960.52	7780.11	7851.83	7959.31	8007.90	8020.81	7901.12	7864.17
10.00°	6395.42	6299.17	6442.23	6388.25	6386.41	6385.27	6375.84	6420.07	6263.32	6274.26	6319.70	6262.48	6317.05	6331.24	6361.65	6284.54	6395.42
12.50°	4629.11	4580.85	4687.66	4648.01	4659.06	4650.24	4693.42	4643.32	4665.29	4620.69	4704.72	4685.72	4694.83	4670.96	4657.40	4687.49	4629.11
15.00°	3184.13	3213.93	3194.43	3272.55	3276.22	3251.63	3229.12	3240.38	3052.54	3176.57	3029.60	3141.79	3167.10	3175.79	3213.61	3128.34	3184.13
17.50°	2006.50	1857.80	2093.51	1965.20	1914.96	1896.25	1920.98	1943.13	1968.01	1870.91	2003.26	1873.68	1829.05	1786.74	1780.08	1901.33	2006.50
20.00°	1260.44	1320.25	1286.13	1348.21	1351.95	1341.21	1327.33	1300.33	1247.59	1290.17	1202.93	1252.83	1247.98	1239.45	1252.64	1260.06	1260.44
22.50°	838.30	792.23	881.50	836.17	816.63	812.51	810.81	816.07	815.32	778.15	811.05	764.10	751.59	741.30	739.76	781.88	838.30
25.00°	572.57	592.39	586.23	605.04	606.50	601.15	593.83	583.29	561.65	574.72	543.21	555.42	551.76	551.72	557.75	561.74	572.57
27.50°	412.58	398.39	426.28	408.69	401.84	401.62	404.73	403.21	402.14	394.34	400.32	387.03	379.68	378.97	379.14	392.60	412.58
30.00°	304.45	307.57	307.15	312.83	313.63	310.44	310.81	305.80	294.97	301.99	290.87	294.77	291.94	292.80	295.20	297.11	304.45
32.50°	228.34	220.35	234.29	226.72	226.82	224.61	228.09	223.14	223.92	220.33	223.94	218.56	215.49	214.04	213.52	221.21	228.34
35.00°	174.80	175.10	177.90	178.43	178.30	177.90	179.32	176.44	171.12	174.65	166.72	169.51	169.67	168.00	169.74	170.78	174.80
37.50°	133.96	131.84	138.36	132.69	131.34	134.44	136.32	134.93	135.11	134.32	133.22	129.48	130.12	126.76	127.64	131.84	133.96
40.00°	106.16	106.34	107.75	107.62	108.50	110.00	108.63	107.68	106.65	109.62	104.37	103.37	105.57	103.62	104.28	106.59	106.16
42.50°	84.92	82.08	85.41	83.36	86.14	86.76	84.56	82.03	86.54	87.19	84.72	80.98	83.16	82.16	81.73	85.69	84.92
45.00°	67.77	66.63	67.77	68.21	68.91	69.33	68.96	67.67	69.81	70.71	66.54	63.83	65.36	66.31	66.09	69.48	67.77
47.50°	52.44	52.04	54.09	53.25	52.54	53.25	54.45	54.27	54.81	55.31	53.20	49.86	50.07	51.65	51.06	55.76	52.44
50.00°	41.79	42.42	42.86	42.74	43.12	42.81	42.26	42.30	40.42	42.42	40.51	39.95	39.61	40.44	40.22	44.49	41.79
52.50°	33.02	32.84	33.53	32.29	33.71	32.96	31.79	30.42	31.37	31.10	32.77	31.08	30.13	29.97	29.89	33.97	33.02
55.00°	25.18	23.43	25.28	23.55	24.37	25.28	24.62	22.86	24.02	23.08	25.53	23.40	22.35	21.41	22.49	24.12	25.18
57.50°	17.68	14.85	17.78	14.99	15.62	17.89	17.46	15.43	16.72	15.86	18.71	16.21	15.31	13.84	15.39	16.07	17.68
60.00°	11.61	9.74	11.12	9.32	10.08	11.45	10.32	10.14	9.43	10.18	11.93	9.52	9.44	8.53	9.65	9.50	11.61
62.50°	6.01	5.31	4.98	4.01	5.22	6.07	5.17	4.92	5.56	5.70	7.23	5.15	5.03	4.52	4.72	5.31	6.01
65.00°	3.65	3.38	2.29	2.73	3.44	3.61	3.06	3.41	2.50	3.26	2.62	2.97	2.72	3.21	3.08	2.88	3.65
67.50°	2.19	1.89	1.57	1.57	1.93	1.78	1.69	1.94	1.68	1.68	1.86	1.99	1.44	2.24	1.78	1.78	2.19
70.00°	1.52	1.78	1.15	1.52	1.41	1.53	1.37	1.74	1.32	1.39	1.19	2.04	1.50	1.90	1.65	1.59	1.52
72.50°	1.05	1.63	0.89	1.43	1.07	1.30	1.25	1.54	1.25	1.25	1.37	1.67	1.59	1.61	1.52	1.24	1.05
75.00°	1.23	1.33	0.94	1.04	1.35	1.10	1.36	1.25	1.21	1.30	1.55	0.97	1.72	1.42	1.41	0.79	1.23
77.50°	1.54	1.16	1.14	0.77	1.56	1.14	1.44	1.02	1.12	1.29	1.33	1.07	1.66	1.34	1.43	0.89	1.54
80.00°	1.51	1.28	1.19	1.21	1.57	1.62	1.46	1.30	1.01	1.21	1.12	1.74	1.42	1.41	1.80	1.28	1.51
82.50°	1.42	1.34	1.18	1.55	1.46	1.73	1.53	1.55	1.05	1.16	1.02	1.67	1.21	1.38	1.97	1.48	1.42
85.00°	1.41	1.28	1.40	1.38	1.01	1.18	1.64	1.63	1.10	1.17	0.94	1.11	1.03	1.21	1.66	1.58	1.41
87.50°	1.41	1.24	1.70	1.24	0.77	0.90	1.52	1.68	1.38	1.23	1.05	1.02	1.08	1.03	1.50	1.28	1.41
90.00°	1.66	1.24	1.78	1.19	1.01	1.06	1.19	1.59	1.69	1.33	1.18	1.19	1.32	0.83	1.63	0.80	1.66
92.50°	1.95	1.28	1.79	1.19	1.14	1.15	1.16	1.45	1.67	1.31	1.61	1.26	1.30	0.92	1.63	0.71	1.95
95.00°	1.62	1.41	1.63	1.34	1.02	1.11	1.39	0.99	1.63	1.17	1.96	1.26	1.08	1.34	1.37	0.78	1.62
97.50°	1.24	1.39	1.43	1.45	1.01	1.09	1.33	0.64	1.63	1.16	1.77	1.24	0.96	1.48	1.19	0.91	1.24
100.00°	1.26	1.13	1.26	1.42	1.23	1.09	1.02	0.78	1.63	1.27	1.59	1.21	0.92	1.34	1.15	1.07	1.26
102.50°	1.31	1.03	1.09	1.38	1.41	1.17	0.98	0.95	1.45	1.21	1.47	1.21	1.13	1.42	1.18	1.20	1.31
105.00°	1.59	1.17	1.18	1.30	1.51	1.32	1.13	1.23	1.28	1.01	1.36	1.24	1.52	1.71	1.34	1.32	1.59

Coefficients of Utilization – Zonal Cavity Method

Values are lumens delivered to the workplane.

RCR	ptc	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	0%
	pcc	80%	80%	80%	80%	70%	70%	70%	70%	50%	50%	50%	30%	30%	30%	10%	10%	0%
	pw	70%	50%	30%	10%	70%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	30%
	0	2545	2545	2545	2545	2485	2485	2485	2485	2372	2372	2372	2269	2269	2269	2175	2175	2130
	1	2455	2409	2366	2329	2403	2362	2325	2291	2275	2246	2219	2195	2173	2152	2122	2105	2063
	2	2371	2291	2225	2169	2326	2254	2195	2145	2186	2138	2097	2123	2085	2052	2065	2035	1995
	3	2291	2188	2109	2045	2252	2160	2087	2029	2105	2045	1996	2055	2006	1964	2008	1968	1931
	4	2217	2098	2011	1945	2183	2075	1995	1933	2031	1964	1910	1991	1934	1888	1953	1906	1871
	5	2148	2018	1927	1860	2118	1999	1915	1852	1964	1891	1836	1931	1869	1820	1900	1847	1815
	6	2084	1947	1854	1788	2057	1931	1845	1782	1902	1826	1770	1874	1809	1759	1848	1792	1762
	7	2024	1882	1790	1725	2000	1869	1782	1721	1844	1768	1712	1821	1754	1703	1800	1740	1712
	8	1967	1822	1731	1669	1946	1812	1726	1666	1791	1714	1659	1772	1703	1652	1753	1692	1666
	9	1914	1768	1679	1619	1895	1759	1674	1616	1742	1665	1611	1725	1656	1606	1709	1647	1623
	10	1865	1719	1631	1573	1848	1711	1627	1571	1696	1619	1567	1681	1612	1563	1668	1605	1582

Cone of Light

Mtg Height	Light Level	Beam Diameter
5.5 ft	328.8 fc	2.3 ft
6.5 ft	235.4 fc	2.8 ft
7.5 ft	176.8 fc	3.2 ft
8.0 ft	155.4 fc	3.4 ft
10.0 ft	99.5 fc	4.3 ft
12.0 ft	69.1 fc	5.1 ft
14.0 ft	50.7 fc	6.0 ft
16.0 ft	38.9 fc	6.8 ft
20.0 ft	24.9 fc	8.5 ft
24.0 ft	17.3 fc	10.2 ft
28.0 ft	12.7 fc	11.9 ft

Average Luminaire Luminance [cd/m²]

	0.00°	45.00°	90.00°
0.00°	29738965	29738965	29738965
45.00°	61403	46325	62444
55.00°	21046	15676	20372
65.00°	2915	1336	2749
75.00°	969	536	1059
85.00°	1126	795	811

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	10.3	11.2	10.7	11.6	11.9	10.7	11.6	11.1	11.9	12.3
	3H	10.2	11.0	10.6	11.3	11.7	10.5	11.3	10.9	11.7	12.1
	4H	10.1	10.8	10.5	11.2	11.6	10.4	11.2	10.9	11.6	12.0
	6H	10.0	10.7	10.4	11.1	11.5	10.4	11.1	10.8	11.5	11.9
	8H	10.0	10.6	10.4	11.0	11.5	10.4	11.0	10.8	11.4	11.8
	12H	10.0	10.6	10.4	11.0	11.4	10.3	10.9	10.8	11.3	11.8
4H	2H	10.0	10.8	10.4	11.1	11.5	10.4	11.2	10.8	11.5	11.9
	3H	9.9	10.5	10.3	10.9	11.3	10.3	10.9	10.7	11.3	11.7
	4H	9.8	10.3	10.2	10.8	11.2	10.2	10.7	10.6	11.1	11.6
	6H	9.8	10.2	10.2	10.7	11.2	10.1	10.6	10.6	11.1	11.5
	8H	9.7	10.2	10.2	10.6	11.1	10.1	10.5	10.6	11.0	11.5
	12H	9.7	10.1	10.2	10.6	11.1	10.1	10.5	10.6	11.0	11.5
8H	4H	9.6	10.1	10.1	10.5	11.0	10.0	10.4	10.5	10.9	11.4
	6H	9.6	9.9	10.1	10.5	11.0	10.0	10.3	10.5	10.8	11.3
	8H	9.6	9.9	10.2	10.5	11.0	10.0	10.3	10.5	10.8	11.3
	12H	9.7	9.9	10.2	10.4	11.0	10.0	10.3	10.6	10.8	11.4
12H	4H	9.6	9.9	10.1	10.4	10.9	9.9	10.3	10.4	10.8	11.3
	6H	9.6	9.9	10.1	10.3	10.9	9.9	10.2	10.5	10.7	11.3
	8H	9.6	9.9	10.1	10.4	11.0	10.0	10.2	10.5	10.7	11.3

Corrected UGR values based on total output energy
 SHR = 1.0

Corrected UGR values based on total output lumens

SHR = 1.0