

Indoor Distribution Test Report

Spectrum Lighting Inc.

994 Jefferson Street
Fall River, MA 02721
+1.508.678.2303

Spectrum Lighting Photometric Lab

Luminaire

TSRA31 21L 35K XN E1 BET xx

Nominal 3.1" Diameter Track Spot Luminaire with Recessed Arm

Test Number

SP-15009

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	2192
Efficacy	109.61 lm/W

Luminous Dimensions

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

Spacing Criterion

Two luminaires, plane 0°	0.25
Two luminaires, plane 90°	0.26
Four luminaires	0.27

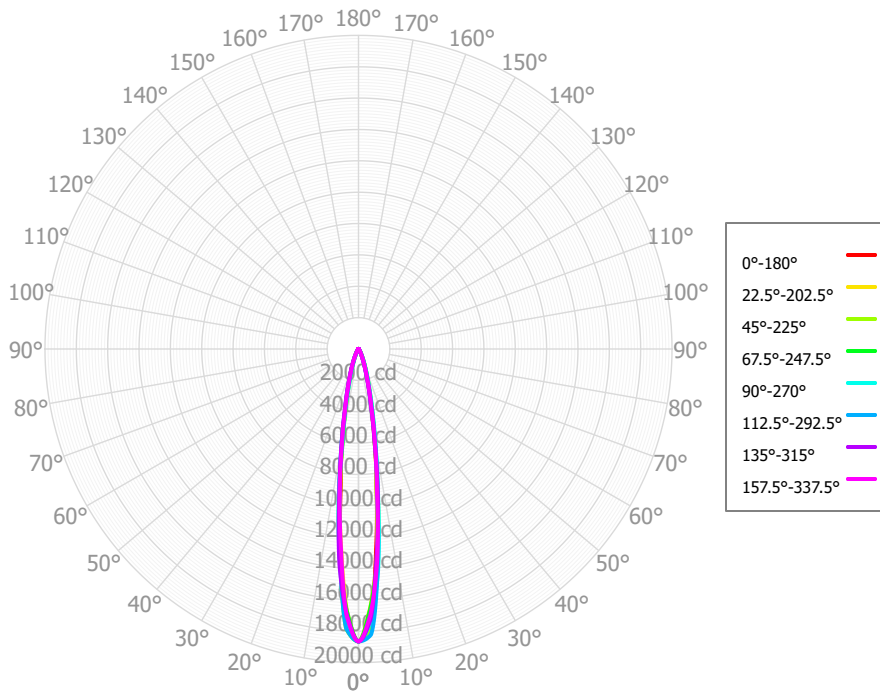
Full Beam Angle

0° - 180°	14°
90° - 270°	15°

IES File Header Contents

Keyword	Value
TEST	SP-15009
TESTLAB	Spectrum Lighting Potometric Lab, VLS-245-981
MANUFAC	Spectrum Lighting
TESTDATE	9/15/2023
ISSUEDATE	9/15/2023
LUMCAT	TSRA31 21L 35K XN E1 BET xx
LUMINAIRE	Nominal 3.1" Diameter Track Spot Luminaire with Recessed Arm
OTHER	Xtra Narrow Beam
OTHER	15 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°	1026.59	46.83%	90.00° - 100.00°	1.23	0.06%
10.00° - 20.00°	747.59	34.10%	100.00° - 110.00°	1.25	0.06%
20.00° - 30.00°	263.31	12.01%	100.00° - 120.00°	2.38	0.11%
30.00° - 40.00°	93.94	4.29%	120.00° - 130.00°	1.10	0.05%
40.00° - 50.00°	38.48	1.76%	130.00° - 140.00°	1.02	0.05%
50.00° - 60.00°	10.02	0.46%	140.00° - 150.00°	0.90	0.04%
60.00° - 70.00°	2.03	0.09%	150.00° - 160.00°	0.74	0.03%
70.00° - 80.00°	1.10	0.05%	160.00° - 170.00°	0.41	0.02%
80.00° - 90.00°	1.24	0.06%	170.00° - 180.00°	0.12	0.01%
0.00° - 90.00°	2184.29	99.64%	0.00° - 180.00°	2192.21	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°	18649.83	18649.83	18649.83	18649.83	18649.83	18649.83	18649.83	18649.83	18649.83	18649.83	18649.83	18649.83	18649.83	18649.83	18649.83	18649.83	18649.83
2.50°	17388.28	16616.06	17786.13	16689.25	17447.56	17862.26	17010.25	17073.72	17151.42	16778.71	17874.00	16801.99	17631.83	18239.12	17316.70	17042.54	17316.70
5.00°	12890.56	13514.78	13345.26	13597.53	14257.66	13314.69	13867.32	12821.23	13198.79	12735.42	13205.33	13607.97	13571.65	14073.01	13268.82	13652.03	12890.56
7.50°	8846.78	9011.17	8708.67	9490.11	9580.48	9253.76	9378.64	9147.35	8655.80	9160.53	8888.18	9488.95	9663.29	9098.33	9461.74	8983.48	8846.78
10.00°	5930.62	5860.49	6149.62	5830.00	6259.97	6269.47	6200.46	6032.69	6089.37	5823.42	6060.85	5575.03	5828.51	6201.95	5781.94	5984.78	5930.62
12.50°	3648.47	3841.34	3719.09	4077.18	4122.01	3957.55	4078.74	3961.30	3701.19	3906.81	3676.55	3874.88	3764.23	3554.57	3753.87	3704.05	3648.47
15.00°	2505.84	2554.61	2692.63	2587.57	2742.27	2734.51	2731.69	2648.51	2683.74	2515.06	2567.62	2329.77	2320.49	2499.62	2353.40	2485.92	2505.84
17.50°	1632.71	1733.26	1748.03	1845.39	1865.49	1815.50	1858.27	1808.60	1712.42	1759.44	1659.03	1651.58	1579.18	1521.98	1600.90	1591.96	1632.71
20.00°	1119.83	1193.49	1252.00	1226.99	1290.73	1264.79	1293.65	1227.94	1244.86	1162.17	1160.37	1054.83	1001.64	1084.83	1019.02	1104.82	1119.83
22.50°	744.00	785.07	813.43	858.86	863.61	856.22	867.08	856.60	807.56	824.38	766.55	743.25	705.28	672.88	713.52	699.15	744.00
25.00°	508.06	544.01	572.97	567.85	599.73	579.32	606.48	568.15	581.90	526.18	530.78	482.76	448.05	485.56	453.58	500.17	508.06
27.50°	348.37	358.03	373.23	393.57	392.58	396.24	398.88	406.24	381.43	386.01	359.44	347.89	331.56	316.87	334.90	323.24	348.37
30.00°	248.16	260.39	272.32	268.10	285.27	278.48	290.50	279.33	284.50	256.63	262.03	240.37	223.65	240.59	227.03	245.05	248.16
32.50°	181.35	182.22	191.07	198.04	201.52	201.89	202.67	210.80	201.97	199.95	190.69	181.56	174.64	172.94	177.35	171.13	181.35
35.00°	133.96	140.67	144.97	146.10	155.70	146.85	156.36	152.28	159.87	145.27	142.23	135.01	127.59	132.84	129.23	135.59	133.96
37.50°	103.10	103.82	108.04	109.88	115.08	115.03	114.73	122.41	122.50	115.06	108.26	104.95	101.48	98.19	102.65	101.64	103.10
40.00°	79.25	82.17	83.33	83.89	91.68	91.93	92.04	94.89	94.75	86.46	83.83	80.51	76.45	75.94	77.38	80.37	79.25
42.50°	61.29	61.43	63.06	64.57	69.36	71.26	70.24	74.70	70.93	67.23	63.92	61.75	57.34	57.49	60.43	60.38	61.29
45.00°	45.10	48.51	47.23	48.83	52.77	51.22	54.71	54.85	52.97	49.16	46.20	46.47	40.41	45.32	44.42	46.35	45.10
47.50°	32.26	35.64	35.06	34.84	36.68	38.04	39.53	39.37	37.96	35.40	35.57	33.86	31.07	33.18	32.15	33.11	32.26
50.00°	20.06	23.37	25.67	24.79	26.13	25.95	27.27	24.95	26.27	23.58	27.42	22.98	21.95	21.08	21.24	22.30	20.06
52.50°	14.00	12.49	17.63	16.10	16.41	18.14	16.16	17.74	16.90	16.72	18.62	13.09	13.35	13.39	13.93	13.29	14.00
55.00°	8.57	8.70	10.35	10.95	11.18	10.64	10.46	11.29	9.53	11.11	9.66	7.92	7.31	9.90	8.57	8.21	8.57
57.50°	6.09	5.39	7.04	6.60	6.69	7.01	5.74	7.90	5.68	7.82	6.04	4.76	5.81	6.86	7.00	4.71	6.09
60.00°	3.72	3.70	5.40	4.48	4.73	3.54	4.14	4.82	4.12	4.98	3.17	2.93	4.26	4.14	5.29	3.70	3.72
62.50°	2.14	2.41	3.28	2.67	3.06	2.22	2.89	2.62	2.86	2.75	2.14	1.50	2.64	2.53	3.36	2.97	2.14
65.00°	0.76	2.03	1.03	1.76	2.12	1.05	2.45	1.21	1.75	1.42	1.22	1.45	1.71	1.51	2.10	2.58	0.76
67.50°	0.98	1.59	0.80	0.92	1.38	0.80	2.09	1.35	1.45	1.03	1.00	1.66	1.47	1.09	1.55	2.16	0.98
70.00°	1.12	1.05	0.95	0.94	1.02	0.64	1.84	1.41	1.44	0.85	0.81	1.39	1.17	0.91	1.18	1.73	1.12
72.50°	0.85	0.70	0.94	0.96	0.85	0.83	1.51	1.35	1.32	0.84	0.85	1.08	0.83	0.94	0.97	1.42	0.85
75.00°	0.61	0.60	0.90	1.05	0.93	0.95	1.08	1.31	1.17	1.01	0.94	0.82	0.75	1.03	0.87	1.20	0.61
77.50°	0.44	0.76	1.07	1.19	1.04	0.90	0.85	1.29	1.39	1.28	1.39	0.58	0.83	1.34	0.83	1.11	0.44
80.00°	0.41	1.15	1.24	1.53	1.19	0.89	0.80	1.22	1.66	1.37	1.63	0.84	0.83	1.67	1.02	1.08	0.41
82.50°	0.65	1.14	1.22	1.73	1.61	0.96	0.90	1.08	1.20	1.39	1.16	1.06	0.78	1.44	1.31	1.22	0.65
85.00°	0.83	0.83	1.19	1.45	2.23	1.07	1.09	1.00	0.73	1.28	0.81	0.99	1.02	1.16	1.10	1.42	0.83
87.50°	0.93	0.90	1.04	1.22	2.12	1.24	1.18	0.96	1.10	1.14	0.79	0.89	1.34	0.89	0.72	1.25	0.93
90.00°	0.97	1.18	0.92	1.09	1.58	1.13	1.21	1.25	1.42	0.95	0.83	0.66	1.34	0.65	0.76	0.97	0.97
92.50°	0.95	1.62	0.98	1.11	1.28	0.73	1.19	1.68	1.17	0.75	0.95	0.55	1.27	0.76	0.88	1.23	0.95
95.00°	1.01	2.13	1.03	1.36	1.08	0.90	1.15	1.67	0.98	0.87	1.02	0.83	1.06	0.85	0.95	1.57	1.01
97.50°	1.14	2.10	1.04	1.38	1.03	1.55	1.13	1.50	1.12	1.02	1.02	1.01	0.83	0.79	1.00	1.39	1.14
100.00°	1.09	1.92	1.03	1.09	1.04	1.49	1.11	1.19	1.21	1.01	1.06	0.98	0.85	0.84	1.23	1.18	1.09
102.50°	0.93	1.48	0.98	0.88	1.24	1.01	1.44	0.84	1.15	1.00	1.14	1.03	0.88	1.32	1.46	1.11	0.93
105.00°	1.09	1.00	1.05	0.75	1.47	0.89	1.82	1.02	1.17	1.18	1.26	1.19	1.15	1.61	1.21	1.07	1.09

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	2608	2608	2608	2608	2546	2546	2546	2546	2431	2431	2431	2326	2326	2326	2230	2230	2184
	1	2523	2478	2438	2402	2471	2431	2396	2363	2343	2315	2290	2261	2240	2221	2187	2171	2156
	2	2445	2369	2306	2253	2399	2332	2276	2228	2263	2218	2179	2199	2163	2132	2140	2112	2087
	3	2372	2275	2199	2139	2333	2245	2177	2122	2191	2134	2088	2140	2094	2056	2093	2056	2024
	4	2305	2192	2110	2047	2270	2169	2094	2035	2125	2062	2012	2085	2032	1989	2047	2003	1966
	5	2242	2120	2035	1972	2212	2101	2022	1963	2065	1998	1946	2032	1975	1929	2001	1953	1919
	6	2184	2055	1969	1907	2157	2040	1959	1901	2011	1941	1888	1983	1923	1876	1958	1905	1864
	7	2129	1997	1911	1851	2106	1984	1903	1846	1960	1889	1837	1937	1875	1828	1916	1861	1819
	8	2079	1944	1859	1801	2058	1933	1853	1797	1913	1841	1790	1894	1830	1784	1876	1819	1777
	9	2031	1895	1812	1756	2013	1886	1808	1754	1869	1798	1748	1853	1789	1743	1838	1780	1738
	10	1987	1851	1770	1716	1970	1843	1766	1714	1829	1758	1710	1815	1751	1705	1802	1744	1701

Cone of Light

Mtg Height	Light Level	Beam Diameter
5.5 ft	616.5 fc	1.4 ft
6.5 ft	441.4 fc	1.6 ft
7.5 ft	331.6 fc	1.9 ft
8.0 ft	291.4 fc	2.0 ft
10.0 ft	186.5 fc	2.5 ft
12.0 ft	129.5 fc	3.0 ft
14.0 ft	95.2 fc	3.5 ft
16.0 ft	72.9 fc	4.0 ft
20.0 ft	46.6 fc	5.0 ft
24.0 ft	32.4 fc	6.0 ft
28.0 ft	23.8 fc	7.0 ft

Average Luminaire Luminance [cd/m²]

	0.00°	45.00°	90.00°
0.00°	55762513	55762513	55762513
45.00°	40864	32290	47813
55.00°	7163	6421	9348
65.00°	608	602	1688
75.00°	480	513	729
85.00°	664	675	1785

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	2.6	3.5	3.0	3.8	4.1	3.5	4.4	3.9	4.7	5.1
	3H	2.7	3.5	3.1	3.8	4.2	3.5	4.3	3.9	4.6	5.0
	4H	2.7	3.4	3.1	3.8	4.2	3.5	4.2	3.9	4.6	5.0
	6H	2.6	3.3	3.1	3.7	4.1	3.5	4.2	3.9	4.5	5.0
	8H	2.6	3.3	3.1	3.7	4.1	3.6	4.2	4.0	4.6	5.0
	12H	2.7	3.3	3.1	3.7	4.1	3.8	4.4	4.2	4.8	5.2
4H	2H	2.4	3.1	2.8	3.5	3.9	3.3	4.0	3.7	4.4	4.8
	3H	2.6	3.2	3.0	3.6	4.0	3.3	3.9	3.8	4.4	4.8
	4H	2.6	3.1	3.1	3.6	4.0	3.3	3.9	3.8	4.3	4.8
	6H	2.7	3.1	3.1	3.6	4.1	3.4	3.9	3.9	4.4	4.8
	8H	2.7	3.1	3.2	3.6	4.1	3.6	4.0	4.1	4.5	4.9
	12H	2.8	3.2	3.3	3.7	4.2	3.9	4.3	4.4	4.8	5.2
8H	4H	2.5	2.9	3.0	3.4	3.9	3.3	3.7	3.7	4.1	4.6
	6H	2.7	3.0	3.2	3.5	4.0	3.4	3.8	3.9	4.3	4.8
	8H	2.9	3.2	3.4	3.7	4.2	3.6	3.9	4.2	4.5	5.0
	12H	3.2	3.4	3.7	3.9	4.5	4.1	4.4	4.6	4.9	5.5
12H	4H	2.5	2.9	3.0	3.4	3.9	3.2	3.6	3.7	4.1	4.6
	6H	2.7	3.0	3.3	3.5	4.1	3.4	3.7	4.0	4.2	4.8
	8H	3.0	3.3	3.5	3.8	4.3	3.7	3.9	4.2	4.4	5.0

Corrected UGR values based on total output energy
 SHR = 1.0

Corrected UGR values based on total output lumens

SHR = 1.0