

Indoor Distribution Test Report

Spectrum Lighting Inc.

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Spectrum Lighting Photometric Lab

Luminaire

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

Test Number

SP-15009_2

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	2271
Efficacy	113.54 lm/W

Luminous Dimensions

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

Spacing Criterion

Two luminaires, plane 0°	0.57
Two luminaires, plane 90°	0.57
Four luminaires	0.54

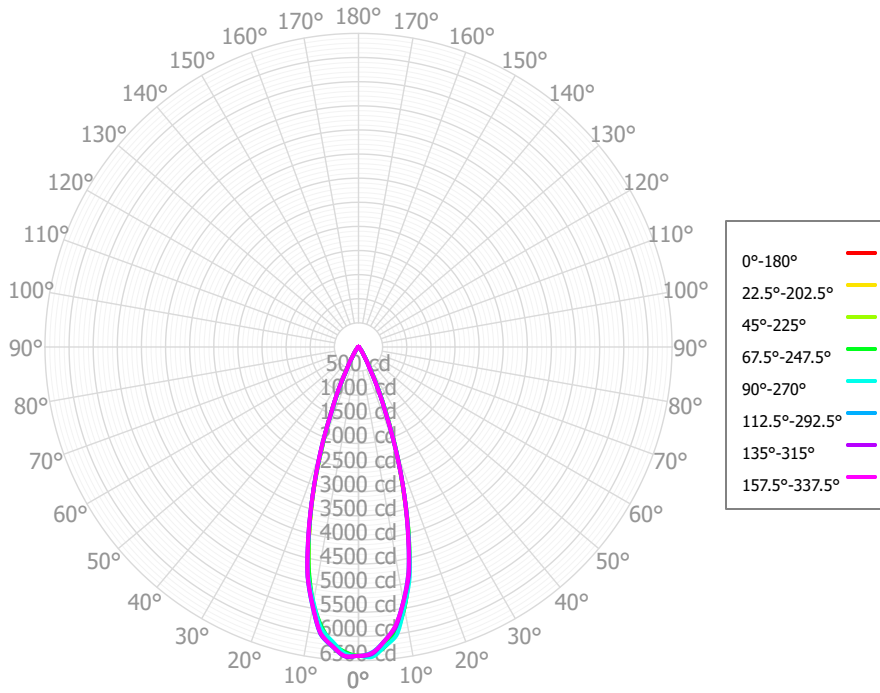
Full Beam Angle

0° - 180°	34°
90° - 270°	34°

IES File Header Contents

Keyword	Value
TEST	SP-15009_2
TESTLAB	Spectrum Lighting Potometric Lab, VLS-245-981
MANUFAC	Spectrum Lighting
TESTDATE	9/15/2023
ISSUEDATE	9/15/2023
LUMCAT	TSRA31 21L 35K MD E1 BET xx
LUMINAIRE	Nominal 3.1" Diameter Track Spot Luminaire with Recessed Arm
OTHER	Medium Beam
OTHER	36 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°	574.94	25.32%	90.00° - 100.00°	1.48	0.06%
10.00° - 20.00°	1058.19	46.60%	100.00° - 110.00°	1.43	0.06%
20.00° - 30.00°	465.88	20.52%	100.00° - 120.00°	2.86	0.13%
30.00° - 40.00°	103.30	4.55%	120.00° - 130.00°	1.33	0.06%
40.00° - 50.00°	38.23	1.68%	130.00° - 140.00°	1.31	0.06%
50.00° - 60.00°	14.01	0.62%	140.00° - 150.00°	1.25	0.06%
60.00° - 70.00°	3.15	0.14%	150.00° - 160.00°	1.01	0.04%
70.00° - 80.00°	1.55	0.07%	160.00° - 170.00°	0.58	0.03%
80.00° - 90.00°	1.56	0.07%	170.00° - 180.00°	0.18	0.01%
0.00° - 90.00°	2260.82	99.56%	0.00° - 180.00°	2270.82	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°	6404.58	6404.58	6404.58	6404.58	6404.58	6404.58	6404.58	6404.58	6404.58	6404.58	6404.58	6404.58	6404.58	6404.58	6404.58	6404.58	6404.58
2.50°	6374.14	6396.00	6384.85	6389.86	6432.47	6417.06	6422.30	6410.12	6372.06	6374.29	6342.83	6329.66	6361.77	6339.52	6371.40	6351.02	6374.14
5.00°	6173.02	6198.91	6235.61	6242.01	6236.13	6237.29	6225.17	6227.27	6200.44	6191.56	6196.87	6169.75	6133.89	6124.07	6123.21	6127.82	6173.02
7.50°	5896.14	5950.57	5959.47	5970.11	6031.26	6010.12	6003.82	5989.22	5917.03	5922.95	5882.05	5851.98	5892.78	5844.10	5869.22	5836.28	5896.14
10.00°	5399.13	5431.84	5485.29	5490.29	5474.23	5476.18	5452.09	5463.95	5432.94	5415.51	5428.54	5393.04	5372.97	5356.70	5357.77	5366.76	5399.13
12.50°	4814.27	4848.88	4830.81	4836.64	4900.36	4880.14	4870.46	4864.66	4807.16	4804.59	4764.60	4747.94	4828.96	4779.06	4837.11	4788.28	4814.27
15.00°	3991.04	3983.89	4018.75	4026.13	3999.87	4012.32	3986.70	4012.19	3949.73	3935.69	3942.46	3950.32	3966.65	3948.07	3971.16	3954.57	3991.04
17.50°	3082.55	3061.06	3075.23	3095.55	3105.04	3099.17	3108.87	3102.97	3088.67	3072.79	3083.72	3100.54	3104.73	3103.25	3106.12	3106.48	3082.55
20.00°	2267.92	2259.95	2253.57	2274.15	2284.37	2291.16	2278.06	2287.25	2222.29	2223.15	2199.84	2212.21	2246.51	2223.61	2257.70	2228.46	2267.92
22.50°	1482.60	1479.46	1523.61	1529.19	1495.71	1497.66	1493.08	1489.05	1493.36	1481.78	1501.88	1501.36	1429.87	1452.52	1435.67	1468.15	1482.60
25.00°	975.08	990.71	990.49	995.21	1007.89	1009.61	996.24	996.05	949.13	956.89	918.85	910.43	935.74	923.23	948.04	929.98	975.08
27.50°	544.24	542.89	592.82	594.12	556.83	555.30	551.07	551.08	555.47	547.96	560.08	545.16	487.91	508.65	492.86	522.38	544.24
30.00°	349.81	363.09	361.36	365.74	380.77	375.73	371.96	366.70	347.04	349.56	325.61	316.91	325.57	325.30	334.47	335.44	349.81
32.50°	212.49	213.50	232.73	236.49	221.90	218.14	215.68	214.71	208.65	204.57	204.64	196.80	181.84	188.90	189.55	200.41	212.49
35.00°	151.41	158.35	159.04	162.82	165.78	162.93	160.39	156.19	148.05	146.53	140.80	136.48	134.90	137.07	143.18	145.39	151.41
37.50°	105.86	110.94	116.33	117.68	114.69	113.37	111.52	106.77	105.40	102.23	102.98	99.31	92.87	96.31	100.27	102.88	105.86
40.00°	82.16	85.49	87.75	88.64	89.01	87.65	87.39	83.32	80.75	78.04	77.01	73.59	72.29	73.72	78.28	78.00	82.16
42.50°	62.13	61.20	66.42	67.09	65.87	62.60	65.58	61.74	61.69	58.94	59.51	56.76	53.62	55.41	58.00	58.53	62.13
45.00°	49.23	48.65	51.23	51.96	53.58	51.32	51.50	50.42	47.78	46.66	45.42	43.90	42.17	43.41	46.17	45.94	49.23
47.50°	37.32	36.45	38.85	39.49	42.03	40.16	38.78	39.55	36.69	36.19	35.35	34.32	31.77	33.11	34.95	35.49	37.32
50.00°	29.05	28.87	29.51	30.42	33.18	31.12	30.11	31.36	27.98	27.95	26.74	26.04	24.76	25.11	26.27	27.55	29.05
52.50°	21.18	21.33	21.40	22.61	24.64	22.22	22.18	23.21	20.76	21.15	19.74	19.28	18.10	18.39	18.33	20.51	21.18
55.00°	16.23	14.56	15.28	16.88	17.12	16.37	16.16	16.55	14.69	15.95	13.26	13.07	12.46	13.25	13.10	14.43	16.23
57.50°	11.52	7.98	9.90	11.83	10.55	10.68	10.86	9.98	10.25	11.26	9.64	9.43	7.93	8.89	8.60	9.83	11.52
60.00°	7.81	6.04	6.46	8.05	6.74	7.14	7.20	6.84	6.94	7.08	6.82	6.61	6.27	5.40	6.47	6.66	7.81
62.50°	4.16	4.13	3.65	4.64	3.68	3.79	4.32	3.81	4.52	4.01	4.55	4.55	4.56	3.41	4.56	4.50	4.16
65.00°	2.80	2.83	2.46	2.77	2.49	2.46	3.04	3.04	2.65	1.96	2.41	2.69	2.75	2.92	3.22	3.22	2.80
67.50°	1.51	1.63	1.73	1.28	1.59	1.26	2.15	2.31	1.74	1.02	1.84	2.03	1.44	2.40	2.23	2.34	1.51
70.00°	1.55	1.44	1.45	1.42	1.36	1.05	2.03	2.25	1.38	1.02	1.59	1.64	1.16	1.85	2.14	1.79	1.55
72.50°	1.60	1.27	1.27	1.90	1.26	0.89	1.80	2.18	1.21	1.22	1.40	1.60	1.06	1.68	1.99	1.56	1.60
75.00°	1.23	1.35	1.41	1.66	1.43	1.05	1.40	2.03	1.13	1.56	1.21	1.63	1.27	1.83	1.69	1.57	1.23
77.50°	0.88	1.46	1.61	1.29	1.53	1.20	1.16	1.87	1.14	1.68	1.47	1.51	1.35	1.73	1.45	1.53	0.88
80.00°	1.24	1.73	1.58	1.34	1.48	1.25	1.18	1.55	1.18	1.65	1.78	1.37	1.20	1.42	1.33	1.44	1.24
82.50°	1.56	1.90	1.52	1.46	1.44	1.34	1.17	1.30	1.28	1.66	1.60	1.32	1.10	1.34	1.26	1.45	1.56
85.00°	1.43	1.55	1.59	1.57	1.41	1.63	1.13	1.43	1.40	1.69	1.36	1.30	1.07	1.43	1.31	1.51	1.43
87.50°	1.30	1.27	1.67	1.68	1.39	1.83	1.21	1.56	1.48	1.59	1.62	1.22	1.27	1.29	1.32	1.48	1.30
90.00°	1.25	1.36	1.34	1.39	1.40	1.63	1.46	1.67	1.55	1.41	1.91	1.13	1.76	1.02	1.24	1.41	1.25
92.50°	1.20	1.40	0.96	1.06	1.40	1.42	1.57	1.71	1.41	1.30	1.59	1.15	1.92	1.13	1.34	1.27	1.20
95.00°	1.04	1.28	1.17	1.11	1.39	1.18	1.55	1.48	1.20	1.22	1.24	1.17	1.66	1.45	1.72	1.10	1.04
97.50°	0.98	1.20	1.42	1.17	1.41	1.01	1.47	1.28	1.40	1.15	1.31	1.28	1.49	1.48	1.79	1.38	0.98
100.00°	1.47	1.21	1.45	1.35	1.45	1.01	1.34	1.20	1.72	1.07	1.39	1.40	1.44	1.36	1.43	1.86	1.47
102.50°	1.83	1.18	1.46	1.54	1.39	1.00	1.42	1.15	1.61	1.21	1.52	1.36	1.35	1.29	1.27	1.64	1.83
105.00°	1.46	0.98	1.41	1.54	1.21	0.97	1.71	1.18	1.39	1.44	1.64	1.30	1.22	1.24	1.35	1.15	1.46

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	2701	2701	2701	2701	2637	2637	2637	2637	2518	2518	2518	2408	2408	2408	2308	2308	2261
	1	2601	2549	2502	2460	2545	2499	2458	2420	2407	2374	2344	2322	2296	2273	2243	2224	2179
	2	2505	2416	2342	2281	2457	2377	2311	2255	2304	2251	2204	2237	2194	2156	2175	2141	2099
	3	2415	2299	2210	2139	2372	2268	2187	2122	2210	2143	2087	2156	2101	2054	2106	2061	2022
	4	2329	2195	2097	2023	2292	2170	2080	2010	2123	2047	1986	2080	2015	1963	2039	1985	1949
	5	2249	2102	1999	1924	2215	2082	1986	1915	2043	1961	1898	2007	1937	1881	1974	1913	1880
	6	2173	2017	1913	1838	2143	2000	1902	1831	1968	1883	1819	1938	1864	1807	1911	1846	1814
	7	2101	1939	1835	1761	2075	1925	1827	1757	1899	1811	1747	1874	1796	1738	1850	1782	1753
	8	2033	1868	1764	1693	2010	1856	1758	1689	1834	1745	1682	1812	1733	1675	1792	1722	1695
	9	1970	1802	1700	1630	1948	1792	1695	1628	1773	1684	1622	1755	1675	1617	1737	1665	1641
	10	1909	1741	1640	1573	1890	1732	1636	1571	1716	1628	1567	1700	1620	1563	1685	1612	1589

Cone of Light

Mtg Height	Light Level	Beam Diameter
5.5 ft	211.7 fc	3.4 ft
6.5 ft	151.6 fc	4.0 ft
7.5 ft	113.9 fc	4.6 ft
8.0 ft	100.1 fc	4.9 ft
10.0 ft	64.0 fc	6.2 ft
12.0 ft	44.5 fc	7.4 ft
14.0 ft	32.7 fc	8.6 ft
16.0 ft	25.0 fc	9.9 ft
20.0 ft	16.0 fc	12.3 ft
24.0 ft	11.1 fc	14.8 ft
28.0 ft	8.2 fc	17.3 ft

Average Luminaire Luminance [cd/m²]

	0.00°	45.00°	90.00°
0.00°	19149519	19149519	19149519
45.00°	44608	35022	48553
55.00°	13566	9479	14306
65.00°	2234	1438	1987
75.00°	965	799	1127
85.00°	1140	902	1128

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	6.5	7.4	6.9	7.8	8.1	6.9	7.8	7.3	8.1	8.5
	3H	6.5	7.3	6.9	7.6	8.0	6.8	7.6	7.2	7.9	8.3
	4H	6.4	7.2	6.9	7.5	7.9	6.8	7.5	7.2	7.9	8.3
	6H	6.4	7.1	6.9	7.5	7.9	6.8	7.4	7.2	7.8	8.2
	8H	6.5	7.1	6.9	7.5	7.9	6.8	7.4	7.2	7.8	8.2
	12H	6.5	7.1	7.0	7.5	7.9	6.8	7.4	7.2	7.8	8.2
4H	2H	6.3	7.1	6.7	7.4	7.8	6.7	7.4	7.1	7.8	8.2
	3H	6.3	6.9	6.7	7.3	7.7	6.6	7.2	7.0	7.6	8.0
	4H	6.3	6.9	6.8	7.3	7.7	6.6	7.1	7.0	7.6	8.0
	6H	6.4	6.8	6.9	7.3	7.8	6.6	7.1	7.1	7.6	8.1
	8H	6.5	6.9	7.0	7.4	7.8	6.7	7.1	7.2	7.6	8.1
	12H	6.6	7.0	7.1	7.5	7.9	6.8	7.1	7.3	7.6	8.1
8H	4H	6.2	6.6	6.7	7.1	7.6	6.5	6.9	6.9	7.3	7.8
	6H	6.4	6.7	6.9	7.2	7.7	6.6	6.9	7.1	7.4	7.9
	8H	6.5	6.8	7.1	7.4	7.9	6.7	7.0	7.2	7.5	8.0
	12H	6.8	7.0	7.3	7.5	8.1	6.8	7.1	7.4	7.6	8.2
12H	4H	6.2	6.5	6.7	7.0	7.5	6.4	6.8	6.9	7.3	7.8
	6H	6.3	6.6	6.9	7.1	7.7	6.6	6.8	7.1	7.3	7.9
	8H	6.6	6.8	7.1	7.3	7.9	6.7	6.9	7.2	7.4	8.0

Corrected UGR values based on total output energy
 SHR = 1.0

Corrected UGR values based on total output lumens

SHR = 1.0