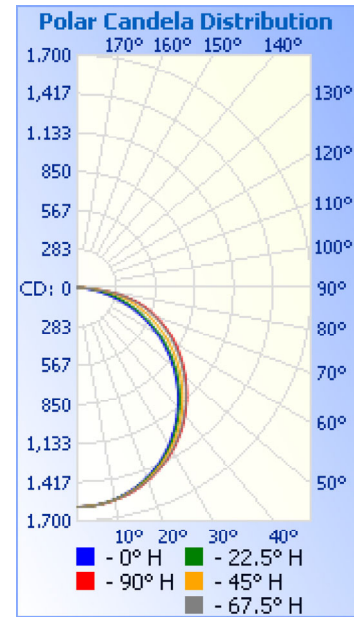


# Photometrics Pro

## Luminaire Photometric Report

**Filename:** CCT Adjustable Troffer 2x4 TF24 - 40W  
**Manufacturer:** SARIN Energy Inc.  
**Luminaire:** SES-TF24-V01 40W  
**Lamp Output:** Total luminaire Lumens: 4742.4  
**Max Candela:** 1,602.4 at Horizontal: 90°, Vertical: 2°  
**Input Wattage:** 37.92  
**Luminous Opening:** Point  
**Test Date:** 2017-06-29  
**Test Lab:** Standard-Tech Co. Ltd  
**Photometry :** Type C  
**Nema Type:** 7 X 7



### Roadway Summary

Cutoff Classification:	CUTOFF	
Distribution:	Type VS	
Max Cd, 90 Deg Vert:	14.4	
Max Cd, 80 to <90 Deg:	336.5	
	Lumens	% Lamp
Downward Street Side:	2,382.1	50.2%
Downward House Side:	2,355.1	49.7%
Downward Total:	4,737.3	99.9%
Upward Street Side:	2.6	0.1%
Upward House Side:	2.9	0.1%
Upward Total:	5.5	0.1%
<b>Total Lumens:</b>	<b>4,742.8</b>	<b>100%</b>

### Flood Summary

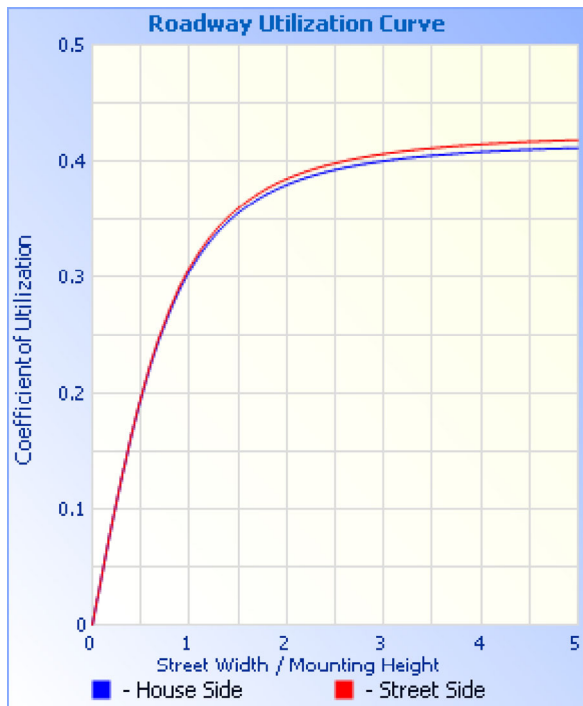
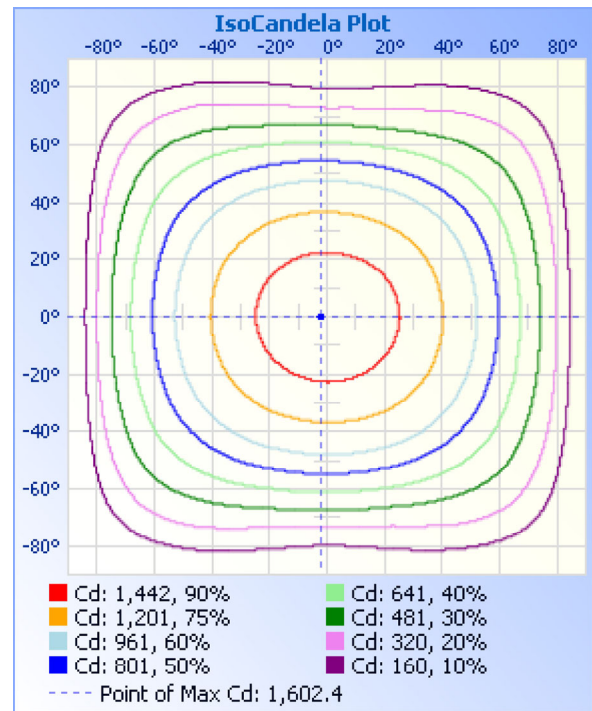
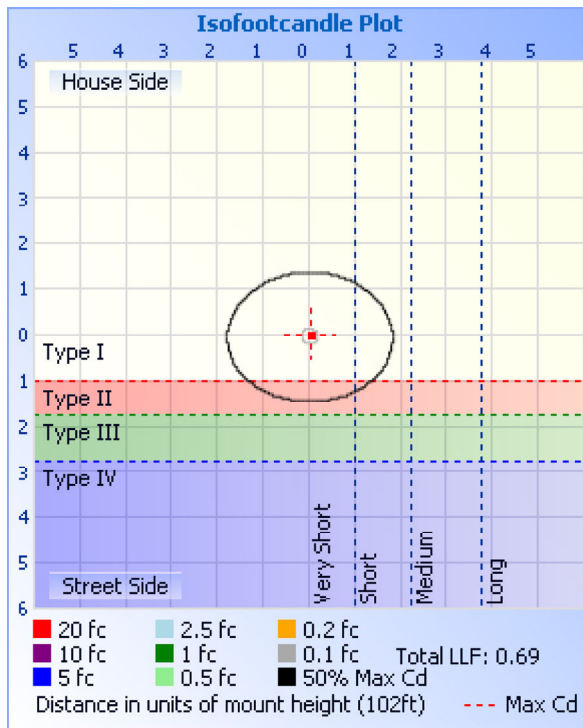
	Efficiency	Lumens	Horizontal Spread	Vertical Spread
Field (10%):	98.8%	4,684.5	168.5	159.4
Beam (50%):	71.9%	3,411.5	120.7	109
<b>Total:</b>	<b>100%</b>	<b>4,740.6</b>		

### Zonal Lumen Summary

Zone	Lumens	% Luminaire
0-30	1,240.0	26.1%
0-40	2,030.0	42.8%
0-60	3,610.6	76.1%
60-90	1,126.3	23.7%
70-100	519.1	10.9%
90-120	3.7	0.1%
0-90	4,736.9	99.9%
90-180	5.5	0.1%
0-180	4,742.4	100%

### Lumens Per Zone

Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	151.4	3.2%	90-100	1.7	0%
10-20	433.1	9.1%	100-110	1.0	0%
20-30	655.4	13.8%	110-120	0.9	0%
30-40	790.0	16.7%	120-130	0.7	0%
40-50	823.3	17.4%	130-140	0.5	0%
50-60	757.3	16.0%	140-150	0.3	0%
60-70	608.9	12.8%	150-160	0.2	0%
70-80	397.4	8.4%	160-170	0.1	0%
80-90	120.0	2.5%	170-180	0.1	0%



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
16.7ft	5.74 fc	46.8 ft	58.6 ft
33.3ft	1.44 fc	93.4 ft	116.9 ft
50.0ft	0.64 fc	140.2 ft	175.6 ft
66.7ft	0.36 fc	187.0 ft	234.2 ft
83.3ft	0.23 fc	233.6 ft	292.5 ft
100.0ft	0.16 fc	280.4 ft	351.1 ft

Vert. Spread: 109.0°  
 Horiz. Spread: 120.7°

**Coefficients Of Utilization - Zonal Cavity Method**

Effective Floor Cavity Reflectance: 20%

RCC %:	80				70				50			30			10			0
RW %:	70	50	30	0	70	50	30	0	50	30	20	50	30	20	50	30	20	0
RCR: 0	1.19	1.19	1.19	1.19	1.16	1.16	1.16	1.00	1.11	1.11	1.11	1.06	1.06	1.06	1.02	1.02	1.02	1.00
1	1.08	1.03	.99	.94	1.05	1.01	.97	.83	.96	.93	.90	.92	.90	.87	.89	.87	.85	.82
2	.98	.89	.82	.76	.95	.87	.81	.69	.84	.78	.73	.80	.76	.72	.77	.74	.70	.68
3	.89	.78	.70	.63	.87	.77	.69	.59	.73	.67	.61	.71	.65	.60	.68	.63	.59	.57

4	.81	.69	.60	.53	.79	.68	.59	.50	.65	.58	.52	.63	.56	.51	.61	.55	.50	.48
5	.75	.62	.52	.46	.73	.60	.52	.44	.58	.51	.45	.56	.50	.44	.54	.48	.44	.42
6	.69	.55	.46	.40	.67	.54	.46	.38	.53	.45	.39	.51	.44	.39	.49	.43	.38	.36
7	.64	.50	.41	.35	.62	.49	.41	.34	.48	.40	.35	.46	.39	.34	.45	.39	.34	.32
8	.60	.46	.37	.31	.58	.45	.37	.30	.44	.36	.31	.42	.36	.31	.41	.35	.30	.28
9	.56	.42	.34	.28	.54	.41	.33	.27	.40	.33	.28	.39	.32	.28	.38	.32	.27	.26
10	.52	.39	.31	.25	.51	.38	.30	.25	.37	.30	.25	.36	.30	.25	.35	.29	.25	.23

Candela Table - Type C																	
	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	1601	1601	1601	1601	1601	1601	1601	1601	1601	1601	1601	1601	1601	1601	1601	1601	1601
1	1602	1602	1601	1601	1602	1601	1601	1602	1600	1599	1601	1601	1602	1601	1601	1601	1602
2	1598	1601	1598	1601	1602	1600	1599	1601	1598	1598	1599	1599	1601	1601	1601	1600	1598
3	1599	1600	1597	1600	1601	1599	1597	1598	1598	1597	1598	1598	1602	1599	1600	1598	1599
4	1597	1598	1596	1599	1598	1596	1595	1596	1594	1595	1595	1596	1600	1598	1598	1595	1597
5	1593	1595	1595	1596	1596	1593	1593	1593	1592	1592	1593	1593	1597	1596	1594	1592	1593
6	1590	1591	1593	1593	1593	1590	1589	1589	1588	1591	1589	1591	1594	1593	1593	1590	1590
7	1587	1588	1588	1589	1590	1586	1585	1584	1583	1586	1585	1587	1589	1589	1588	1586	1587
8	1581	1581	1583	1584	1587	1583	1578	1580	1576	1580	1580	1583	1585	1583	1584	1581	1581
9	1576	1577	1578	1580	1582	1577	1573	1573	1573	1575	1574	1578	1581	1579	1579	1575	1576
10	1569	1571	1573	1575	1576	1572	1568	1566	1568	1569	1568	1572	1575	1574	1573	1568	1569
11	1562	1565	1568	1569	1571	1567	1562	1559	1560	1562	1562	1567	1571	1568	1566	1562	1562
12	1556	1559	1562	1564	1566	1560	1554	1553	1549	1555	1555	1561	1566	1563	1561	1555	1556
13	1547	1551	1553	1558	1560	1553	1546	1544	1543	1547	1548	1553	1558	1556	1554	1549	1547
14	1538	1544	1544	1551	1554	1544	1539	1535	1534	1537	1540	1545	1553	1549	1547	1540	1538
15	1529	1536	1538	1543	1547	1538	1531	1525	1525	1528	1532	1537	1544	1540	1537	1530	1529
16	1520	1527	1529	1534	1538	1530	1521	1515	1514	1517	1524	1529	1535	1534	1529	1520	1520
17	1510	1514	1520	1527	1530	1521	1512	1505	1504	1506	1514	1520	1526	1523	1519	1511	1510
18	1499	1504	1511	1518	1521	1513	1501	1495	1495	1495	1505	1511	1518	1515	1508	1501	1499
19	1487	1492	1500	1508	1512	1502	1490	1483	1484	1483	1493	1500	1508	1506	1498	1490	1487
20	1474	1481	1490	1498	1502	1493	1479	1471	1472	1471	1482	1489	1497	1496	1489	1477	1474
21	1462	1470	1478	1487	1492	1482	1468	1458	1458	1460	1469	1479	1487	1484	1477	1466	1462
22	1449	1459	1465	1476	1482	1471	1456	1446	1445	1446	1456	1467	1477	1472	1464	1452	1449
23	1435	1446	1454	1465	1469	1459	1443	1432	1429	1432	1443	1457	1466	1461	1452	1440	1435
24	1423	1432	1440	1454	1457	1446	1429	1418	1415	1418	1431	1444	1453	1451	1438	1425	1423
25	1407	1417	1426	1442	1445	1433	1416	1403	1399	1404	1417	1432	1441	1436	1425	1412	1407
26	1391	1402	1413	1427	1433	1420	1403	1389	1384	1390	1404	1419	1429	1424	1410	1397	1391
27	1376	1386	1399	1415	1420	1407	1389	1373	1368	1373	1389	1405	1413	1409	1395	1380	1376
28	1359	1372	1384	1400	1407	1392	1374	1357	1351	1358	1374	1390	1400	1395	1380	1364	1359
29	1343	1357	1370	1386	1393	1378	1358	1341	1334	1343	1360	1376	1387	1380	1364	1347	1343
30	1327	1341	1354	1373	1378	1363	1342	1324	1317	1325	1343	1361	1373	1367	1349	1332	1327
31	1309	1324	1338	1359	1364	1348	1326	1307	1300	1308	1326	1345	1358	1350	1333	1313	1309
32	1291	1306	1323	1343	1349	1332	1310	1289	1280	1290	1309	1329	1343	1333	1317	1297	1291
33	1271	1287	1307	1328	1334	1316	1292	1270	1262	1273	1292	1312	1325	1317	1298	1279	1271
34	1255	1269	1290	1312	1319	1300	1275	1252	1243	1254	1275	1295	1309	1299	1281	1260	1255
35	1237	1250	1273	1296	1303	1284	1259	1234	1224	1234	1257	1279	1292	1284	1263	1241	1237
36	1217	1233	1255	1278	1287	1266	1240	1215	1206	1216	1238	1261	1274	1265	1244	1222	1217
37	1197	1213	1237	1262	1270	1250	1222	1196	1185	1198	1220	1244	1257	1247	1225	1202	1197
38	1178	1194	1218	1246	1253	1232	1204	1176	1165	1177	1201	1226	1241	1229	1205	1182	1178
39	1157	1174	1200	1227	1236	1215	1184	1156	1145	1157	1181	1207	1221	1211	1186	1163	1157
40	1137	1154	1181	1208	1217	1196	1164	1135	1124	1136	1161	1188	1202	1191	1167	1141	1137
41	1117	1134	1161	1191	1199	1178	1145	1115	1102	1115	1142	1169	1184	1172	1146	1121	1117
42	1095	1113	1141	1172	1181	1160	1126	1094	1080	1094	1121	1149	1164	1152	1126	1100	1095
43	1074	1091	1122	1155	1163	1142	1105	1072	1059	1072	1100	1128	1144	1132	1104	1079	1074
44	1052	1070	1102	1136	1145	1121	1085	1051	1038	1050	1079	1108	1125	1111	1083	1057	1052
45	1030	1048	1081	1117	1126	1102	1064	1028	1015	1028	1058	1087	1106	1091	1062	1035	1030
46	1008	1027	1060	1096	1107	1082	1043	1006	993	1007	1036	1066	1085	1070	1041	1013	1008

47	985	1005	1039	1076	1087	1062	1022	983	970	984	1014	1046	1064	1050	1018	991	985
48	961	983	1018	1057	1068	1042	1001	961	947	961	992	1024	1043	1029	996	968	961
49	939	960	997	1037	1047	1022	978	939	924	937	970	1003	1022	1008	974	945	939
50	916	938	976	1017	1028	1002	957	916	899	914	947	981	1001	986	951	921	916
51	892	914	955	996	1010	982	935	893	875	891	925	960	981	964	928	898	892
52	867	891	933	975	988	961	914	869	852	867	903	938	959	943	906	876	867
53	844	867	911	955	969	940	892	846	828	843	878	916	938	922	882	850	844
54	819	844	889	935	949	920	870	822	804	819	855	893	917	898	859	825	819
55	794	821	867	914	929	899	847	798	779	794	831	872	895	874	835	801	794
56	769	796	845	893	909	878	825	774	754	769	808	850	873	853	812	777	769
57	745	772	823	872	888	857	802	751	729	745	784	828	852	831	788	752	745
58	720	748	800	851	868	837	779	726	704	720	761	806	830	809	764	727	720
59	695	724	778	830	848	815	756	701	679	696	737	784	809	787	740	701	695
60	670	699	755	810	828	794	734	677	654	671	714	763	787	764	716	677	670
61	645	674	733	789	807	772	711	651	627	645	690	741	766	742	693	651	645
62	619	649	711	768	786	751	688	627	601	619	667	719	744	718	669	626	619
63	593	625	688	748	765	730	665	602	575	594	643	697	722	697	645	600	593
64	566	600	664	726	743	709	643	577	549	569	620	675	701	675	621	574	566
65	540	575	642	704	722	688	619	553	524	544	596	653	679	653	597	549	540
66	514	550	619	683	701	666	596	528	497	518	573	631	658	632	574	523	514
67	488	525	597	661	679	644	573	503	471	493	550	610	651	609	550	497	488
68	461	499	574	639	656	622	551	478	446	467	527	593	616	587	527	472	461
69	435	474	552	617	634	599	527	453	419	442	504	575	592	580	503	446	435
70	408	449	529	594	613	577	505	428	393	417	480	544	570	544	480	420	408
71	382	425	505	571	590	555	481	403	366	392	458	522	548	521	457	395	382
72	355	400	483	548	567	532	458	378	340	367	436	499	526	498	434	370	355
73	329	376	460	524	543	509	436	353	314	342	424	477	502	475	412	345	329
74	302	352	436	499	519	485	413	329	288	318	392	454	479	452	398	320	302
75	276	328	414	474	492	460	389	304	262	294	370	431	454	430	367	296	276
76	250	305	390	449	465	434	366	280	237	271	348	407	429	405	346	272	250
77	225	281	366	421	435	408	343	257	213	248	326	382	401	380	324	249	225
78	201	258	342	391	403	378	319	234	188	226	304	355	371	354	301	226	201
79	176	236	317	359	370	347	294	212	164	205	281	325	339	325	279	204	176
80	153	213	290	326	336	314	268	190	141	186	256	295	306	294	255	183	153
81	130	192	262	293	302	282	240	169	119	166	230	262	273	263	230	163	130
82	108	170	231	259	266	249	211	148	98	147	201	231	238	231	203	144	108
83	88	149	201	222	225	212	181	128	79	128	173	197	203	198	174	125	88
84	69	126	169	182	182	172	151	106	61	108	144	161	162	162	146	106	69
85	52	103	135	139	136	129	118	84	45	87	113	122	122	124	116	86	52
86	37	79	99	96	90	87	83	62	31	65	81	84	81	85	84	66	37
87	24	55	62	53	47	46	47	40	20	42	49	46	42	47	51	45	24
88	14	30	28	19	13	13	17	18	11	21	20	15	11	15	21	24	14
89	6	8	4	2	2	1	2	16	3	17	17	2	2	3	3	6	6
90	0	1	1	2	1	1	1	14	0	13	14	2	2	2	2	1	0
91	0	0	1	2	1	1	0	13	0	9	12	2	2	2	2	1	0
92	0	0	1	1	1	1	0	11	0	5	9	2	2	2	1	1	0
93	0	0	1	1	1	1	0	9	1	1	7	2	2	2	1	1	0
94	0	0	1	1	1	1	0	7	1	1	4	2	1	2	1	1	0
95	0	0	1	1	1	1	0	6	1	1	1	2	1	2	1	1	0

96	0	0	1	1	1	1	0	4	1	1	1	2	1	2	1	1	0
97	0	0	1	1	1	1	0	2	1	1	1	2	1	2	1	1	0
98	0	0	1	1	1	1	0	0	1	1	1	2	1	2	1	1	0
99	0	0	1	1	1	1	0	0	1	1	1	2	1	2	1	1	0
100	0	0	1	1	1	1	0	0	1	1	1	2	1	2	1	1	0
101	0	0	1	1	1	1	0	0	1	1	1	2	1	2	1	1	0
102	0	0	1	1	1	1	0	0	1	1	1	2	1	2	1	1	0
103	0	0	1	1	1	1	0	0	1	1	1	2	2	2	1	1	0
104	0	0	1	1	1	1	0	0	1	1	1	2	2	2	1	1	0
105	0	0	1	1	1	1	0	0	1	1	2	2	2	2	1	1	0
106	0	0	1	1	1	1	0	0	1	1	2	2	2	2	1	1	0
107	0	0	1	1	1	1	0	0	1	1	2	2	2	2	1	1	0
108	1	0	1	1	1	1	0	0	1	1	1	2	2	2	1	1	1
109	1	0	1	1	1	1	0	0	1	1	1	2	2	2	1	1	1
110	1	0	1	1	1	1	0	0	1	1	1	2	2	2	1	1	1
111	0	0	1	1	1	1	0	0	1	1	1	2	2	2	2	1	0
112	0	0	1	1	1	1	0	0	1	1	1	2	2	2	2	1	0
113	0	0	1	1	1	1	0	0	1	0	1	2	2	2	2	1	0
114	0	0	1	1	1	1	0	0	0	0	1	2	2	2	2	1	0
115	0	0	1	1	1	1	0	0	0	0	1	2	2	2	2	1	0
116	0	0	1	1	1	1	0	0	0	0	1	2	2	2	2	1	0
117	0	0	1	1	1	1	0	0	0	0	1	2	2	2	2	1	0
118	0	0	1	1	1	1	0	0	0	0	1	2	2	2	2	0	0
119	0	0	1	1	1	1	0	0	0	0	1	2	2	2	2	0	0
120	0	0	1	1	1	1	0	0	0	0	1	2	2	2	2	0	0
121	0	0	1	1	1	1	0	0	0	0	1	2	2	2	2	0	0
122	0	0	1	1	1	1	0	0	0	0	1	2	2	2	2	0	0
123	0	0	1	1	1	1	0	0	0	0	1	2	2	2	2	0	0
124	0	0	1	1	1	1	0	0	0	0	1	1	2	2	2	0	0
125	0	0	1	1	1	1	0	0	0	0	1	1	2	2	2	0	0
126	0	0	1	1	1	1	0	0	0	0	1	1	2	2	2	0	0
127	0	0	1	1	1	1	0	0	0	0	1	1	2	2	2	0	0
128	0	0	1	1	1	1	0	0	0	0	1	1	2	2	1	0	0
129	0	0	1	1	1	0	0	0	0	0	1	1	2	2	2	0	0
130	0	0	1	1	1	0	0	0	0	0	1	1	2	2	1	0	0
131	0	0	1	1	1	0	0	0	0	0	1	1	2	2	1	0	0
132	0	0	1	1	1	0	0	0	0	0	1	1	1	2	1	0	0
133	0	0	1	1	1	0	0	0	0	0	1	1	1	1	1	0	0
134	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	0	0
135	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	0	0
136	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	0	0
137	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0
138	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0
139	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0
140	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0
141	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0
142	0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	0
143	0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	0
144	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	0	0

145	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	0	0
146	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	0	0
147	0	0	0	1	0	0	0	0	0	0	0	1	1	1	0	0	0
148	0	0	0	1	0	0	0	0	0	0	0	1	1	1	0	0	0
149	0	0	0	1	0	0	0	0	1	0	0	1	1	1	0	0	0
150	0	0	0	1	0	0	0	0	1	0	0	1	1	1	0	0	0
151	0	0	0	1	0	0	0	0	1	0	0	1	1	1	0	0	0
152	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	0
153	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	0
154	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0
155	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0
156	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	1	0
157	1	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	1
158	1	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	1
159	1	0	0	0	0	0	0	0	1	1	0	0	1	1	0	1	1
160	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	1
161	1	0	0	0	0	0	0	1	1	1	0	0	1	0	0	1	1
162	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1
163	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1
164	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1
165	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1
166	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1
167	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1
168	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1
169	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1
170	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1
171	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1
172	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1
173	1	1	1	0	0	0	0	1	1	1	1	0	0	0	1	1	1
174	1	1	1	0	0	0	0	1	1	1	1	0	0	0	1	1	1
175	1	1	1	1	0	0	0	1	1	1	1	1	0	0	1	1	1
176	1	1	1	1	1	0	0	1	1	1	1	1	0	0	1	1	1
177	1	1	1	1	1	0	0	1	1	1	1	1	0	0	1	1	1
178	1	1	1	1	1	0	0	1	1	1	1	1	0	0	1	1	1
179	1	1	1	1	1	0	0	1	1	1	1	1	0	0	1	1	1
180	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

**Luminaire Report Summary**

IESNA:LM-63-2002  
[TEST]  
[TESTDATE] 2017-06-29  
[TESTLAB] Standard-Tech Co. Ltd  
[ISSUE DATE] 2017-06-29  
[MANUFAC] SARIN Energy Inc.  
[LUMINAIRE] SES-TF24-V01 40W  
[\_TOTALLUMINAIRELUMENS] 4742.4  
[\_LAMPPOSITION] 0,0  
[OTHER] EVERFINE GO-R5000\_V2 SYSTEMGamma(deg) Fz(lm) Ft(lm) %Lum %Lamp0- 10 151.43  
151.43 3.19 3.1910- 20 433.15 584.58 12.33 12.3320- 30 655.42 1239.99 26.15  
26.1530- 40 790.13 2030.12 42.81 42.8140- 50 823.41 2853.53 60.17 60.1750- 60  
757.47 3611.01 76.14 76.1460- 70 608.86 4219.87 88.98 88.9870- 80 397.24 4617.11  
97.35 97.3580- 90 120.00 4737.11 99.88 99.8890-100 1.75 4738.86 99.92 99.92100-110  
1.03 4739.89 99.94 99.94110-120 0.94 4740.83 99.96 99.96120-130 0.70 4741.53 99.98  
99.98130-140 0.47 4741.99 99.99 99.99140-150 0.28 4742.27 99.99 99.99150-160 0.20  
4742.47 100.00 100.00160-170 0.11 4742.58 100.00 100.00170-180 0.06 4742.64 100.00  
100.00

FILE: CREATED USING ABSOLUTE PHOTOMETRY  
FILE: CANDELA MULTIPLIER: 1  
FILE: VERTICAL ANGLES: 181, HORIZONTAL ANGLES: 17  
FILE: COORDINATE SYSTEM: TYPE C  
FILE: UNIT OF MEASURE: METRIC  
FILE: BALLAST FACTOR: 1

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Reported data calculated from manufacturer's data file, based on IES recommended methods.