NVLAP LAB CODE 201011-0

Report No.: GZE140805

LM-79-08 Test Report

For

MLS CO., LTD

(Brand Name: MLS)

NO.1 MULINSEN RD XIAOLAN TOWNSHIP

ZHONGSHAN, GUANGDONG CHINA

Two-Foot Linear Replacement Lamps

Model name(s):MT8S04-6;
MT8S04-6-35K;
MT8N04-6;
MT8Z04-6

Representative (Tested) Model: MT8S04-6,
MT8Z04-6

Model Difference: All construction and rating are the same, except CCT

Test & Report By:

Sean Zhuo

Engineer: Sean Zhuo

Date: Sep.10,2014

Review By:

Tommy Liang

Manager: Tommy Liang

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

NVLAP LAB CODE 201011-0

U.S. Department of Energy

Lighting Facts™ Uniform LM-79 Reporting Template

Laboratory Information:

Name of Test Laboratory	Standard-Tech Co. Ltd
Date of Test Report	Sep.10,2014
Test Report No.	GZE140805
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	MLS CO., LTD	
Brand Name	MLS	
Model Number	MT8S04-6	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Two-Foot Linear Replacement Lamps	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	

Electrical Measurements:	**Integrating Sphere Output**	**Goniophotometer Output**	
Input Wattage	11.15	--	W
Input Current	0.0958	--	A
Input Voltage (ac)	120.0	--	V
Power Factor	0.9705	--	
Off-State Power	0	--	W
Photometric Characteristics			
Total Initial Lumen Output	1178	--	lm
Initial Lumen Efficacy	105.65	--	lm/w
Correlated color temperature / CCT	2900	--	K
Color rendering index / CRI	83.1	--	
R9 Value	11	--	
Duv	-0.0012	--	
Luminous Intensity Distribution			
Center beam candlepower (if applicable)	-----	-----	cd
Beam angle (if applicable)			°
Zonal lumens in the 0°-60° zone			%
Zonal lumens in the 60°-90° zone			%
Zonal lumens in the 90°-120° zone			%
Zonal lumens in the 120°-180° zone			%

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Tel: 8620-3229 0320 Fax: 8620-32290422 http://www.standard-tech.com

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Lighting Facts™ Uniform LM-79 Reporting Template

Laboratory Information:

Name of Test Laboratory	Standard-Tech Co. Ltd
Date of Test Report	Sep.10,2014
Test Report No.	GZE140805
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	MLS CO., LTD	
Brand Name	MLS	
Model Number	MT8Z04-6	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Two-Foot Linear Replacement Lamps	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	

Electrical Measurements:	**Integrating Sphere Output**	**Goniophotometer Output**	
Input Wattage	11.13	--	W
Input Current	0.0959	--	A
Input Voltage (ac)	120.0	--	V
Power Factor	0.9681	--	
Off-State Power	0	--	W
Photometric Characteristics			
Total Initial Lumen Output	1214	--	lm
Initial Lumen Efficacy	109.07	--	lm/w
Correlated color temperature / CCT	4986	--	K
Color rendering index / CRI	83.9	--	
R9 Value	15	--	
Duv	0.0046	--	
Luminous Intensity Distribution			
Center beam candlepower (if applicable)	-----	-----	cd
Beam angle (if applicable)			°
Zonal lumens in the 0°-60° zone			%
Zonal lumens in the 60°-90° zone			%
Zonal lumens in the 90°-120° zone			%
Zonal lumens in the 120°-180° zone			%

Test Specifications:	
Date of Receipt	: Sep.08, 2014
Date of Test	: Sep.09, 2014
Test item	: Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
Reference Standard	IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources CIE 15-2004 Technical Report Colorimetry IESNA LM-16-93 Practical Guide to Colorimetry of Light Source IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

Test Methods

1. Photometric and Electrical measurements – Light Distribution Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at 25° C ± 1° C, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals.

2. Photometric and Electrical Measurements – Integrating Sphere Method:

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º C. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at least 5 nm intervals over the range of 380 to 780 nm.

1. Product Information:

Brand Name	MLS
Model Number	MT8X04-6
Luminaire Type	Two-Foot Linear Replacement Lamps
Rated Voltage / Frequency	100 ~ 277 Vac, 60 Hz
Nominal Power	12W
Rated Initial Lamp Lumen	--
Declared CCT	3000K,3500K,4000K,5000K
LED Manufacturer	MLS
LED Model	E2835US24
Sample Receipt Date	Sep.08, 2014
Sample Number	140805-1,2(3000K),-3(5000K)
Photo	

2.1 Electrical, Photometric and Chromaticity Measurements *(Refer to Work Instruction QD25)*	**IES LM-79 2008**

Test date	2014-09-09	**Test Ambient:**	25.2 ° C
Test Orientation	Horizontal	**Stabilization Time (min)**	90
Model Number	MT8S04-6		

Electrical Measurement for Bare Lamp :

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
140805-1	120.0	60	0.0958	11.15	0.9705	11.62
	277.0	60	0.0461	11.68	0.9143	17.34

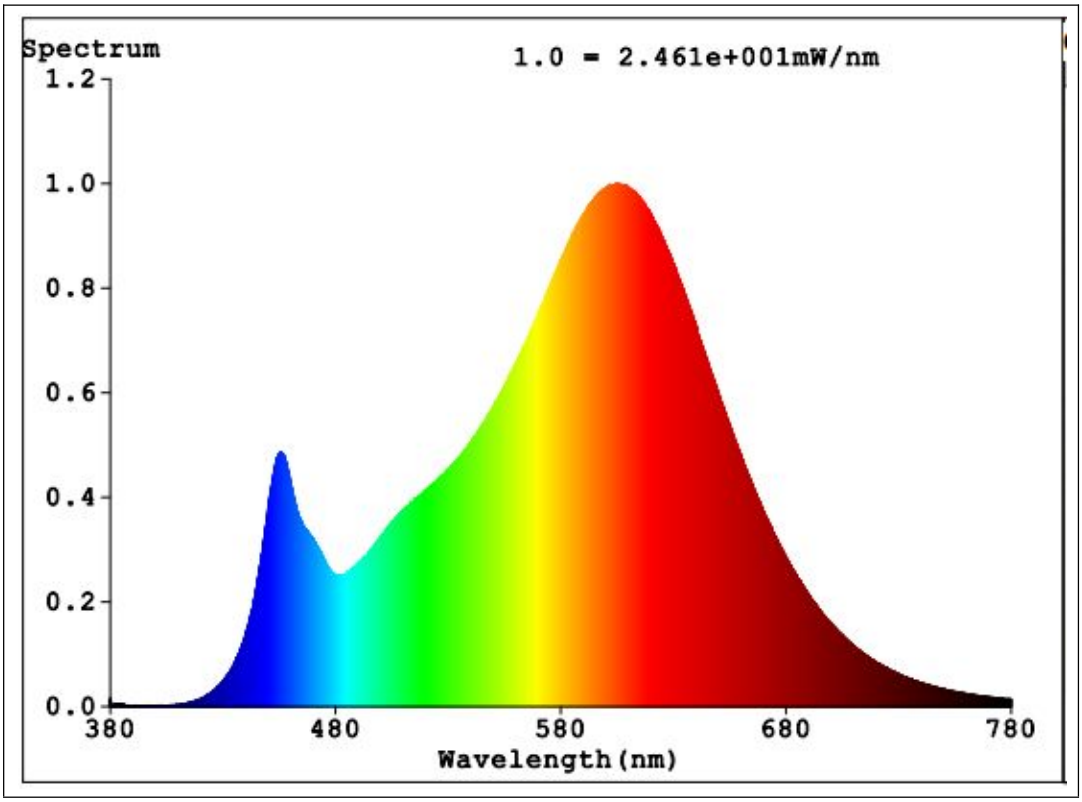
Sphere-Spectroradiometer Method for Bare Lamp:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	83.1
R9	11
CCT (K)	2900
Chromaticity (x, y)	x=0.4425 y=0.4029
Chromaticity (u', v')	u'=0.2546 v'=0.5218
Duv	-0.0012
Total Initial Lumen Output(lm)	1178
Initial Lumen Efficacy(lm/w)	105.65

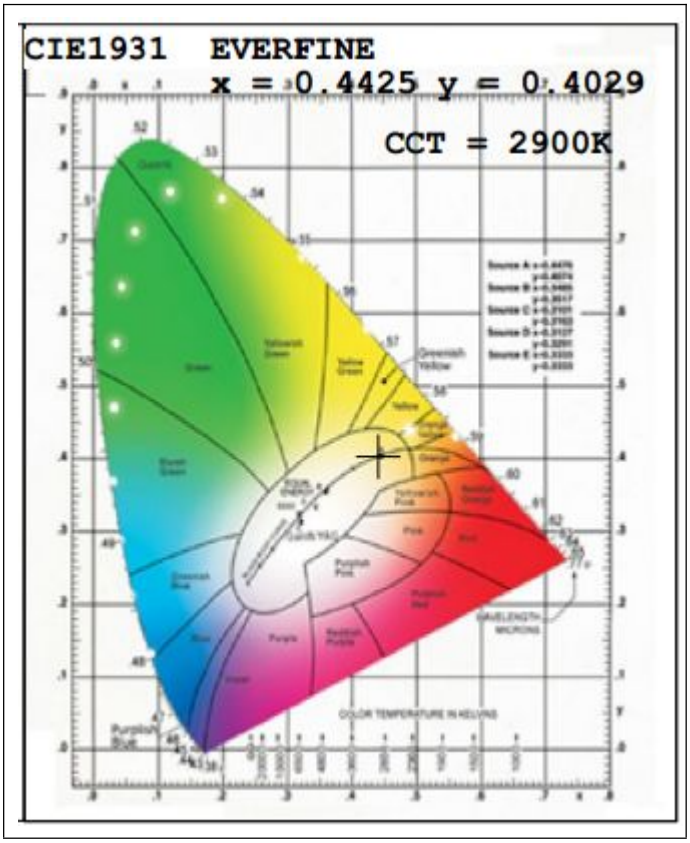
Special Color Rendering Indices			
R1	83	R9	11
R2	94	R10	87
R3	93	R11	79
R4	80	R12	77
R5	83	R13	86
R6	93	R14	97
R7	81	R15	75
R8	58	--	--

Spectral Power Distribution

Spectral Power Distribution:



Chromaticity Diagram



2.2 Electrical, Photometric and Chromaticity Measurements *(Refer to Work Instruction QD25)*	**IES LM-79 2008**

Test date	2014-09-09	**Test Ambient:**	25.2 ° C
Test Orientation	Horizontal	**Stabilization Time (min)**	90
Model Number	MT8S04-6		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
140805-1,2	120.0	60	0.2864	33.26	0.9677	12.53
	277.1	60	0.1349	34.05	0.9107	16.01

Color Data for 3-lamp in Luminaire Fixture Lithonia 2GT8 lensed 2x2:

Parameter	Result
Test Voltage (V)	120.1
Frequency (Hz)	60
Color Rendering Index (CRI)	83.1
R9	11
CCT (K)	2899
Chromaticity (x, y)	x=0.4423 y=0.4027
Chromaticity (u', v')	u'=0.2547 v'=0.5216
Duv	-0.0013

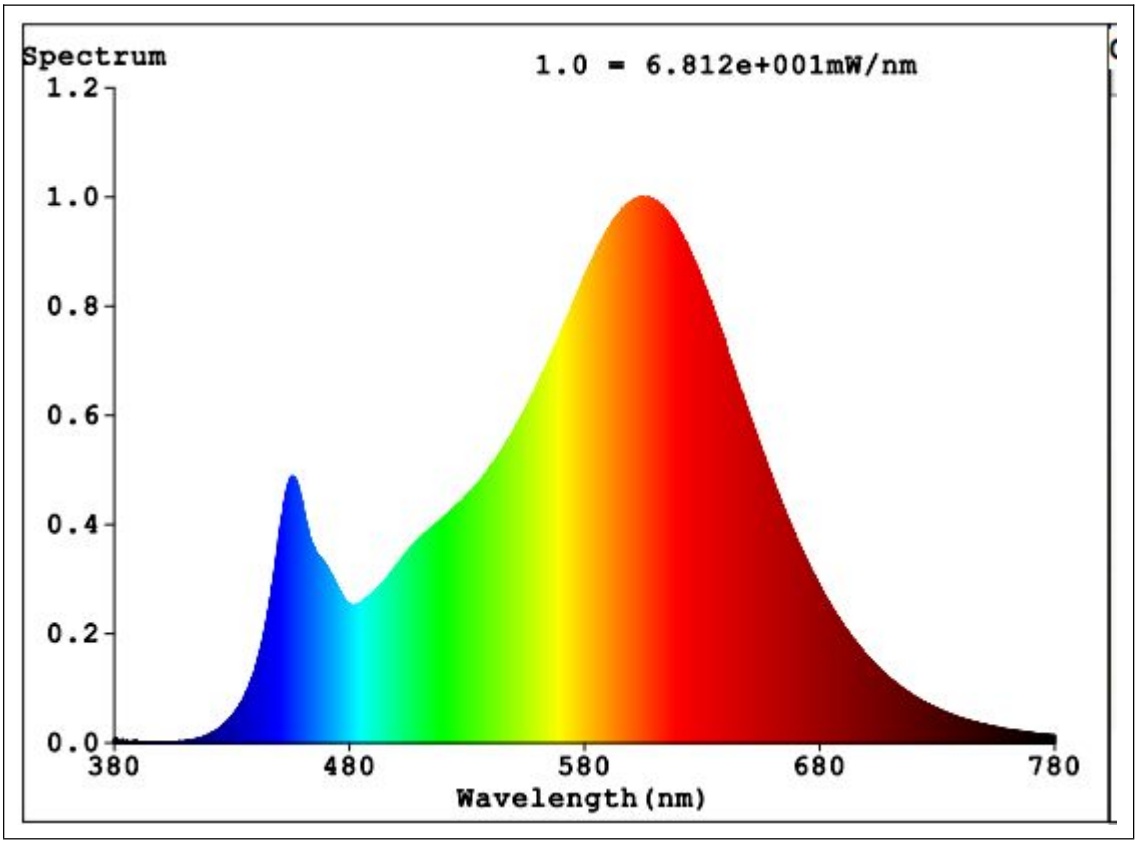
Special Color Rendering Indices			
R1	83	R9	11
R2	94	R10	87
R3	92	R11	79
R4	79	R12	77
R5	83	R13	86
R6	94	R14	96
R7	81	R15	75
R8	59	--	--

Goniophotometer Method in Luminaire Fixture Lithonia 2GT8 lensed 2x2:

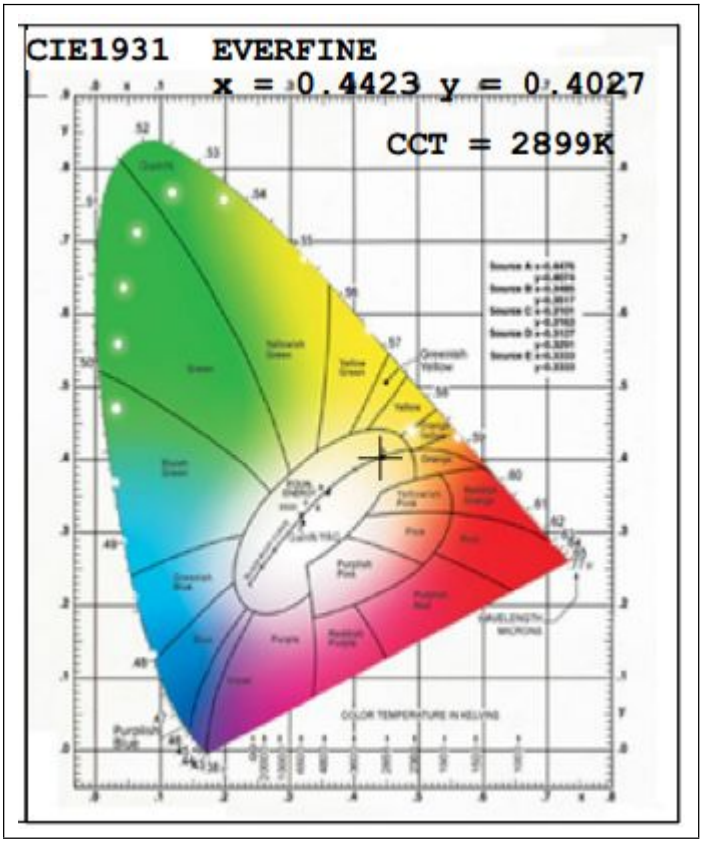
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	2762.9
Luminous Efficacy (lm/W)	83.07
Beam Angle°	95.2
Center Beam Candle Power (cd)	1197
S/MH(C0/180)	1.28
S/MH(C90/270)	1.17

Spectral Power Distribution

Spectral Power Distribution:



Chromaticity Diagram



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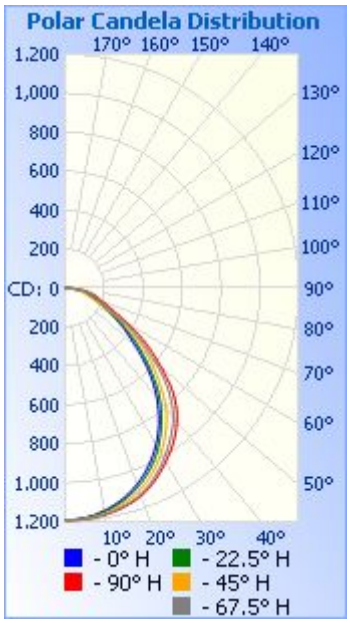
Zonal Lumen Tabulation

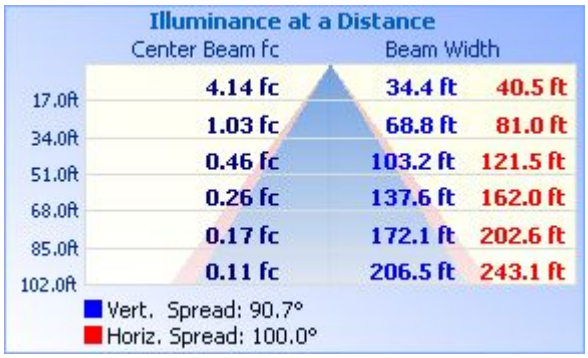
Zonal Lumen Summary			
Zone	Lumens	% Lamp	% Luminaire
0-30	911.3	33%	33%
0-40	1,459.5	52.8%	52.8%
0-60	2,345.5	84.9%	84.9%
60-90	411.2	14.9%	14.9%
70-100	186.6	6.8%	6.8%
90-120	2.1	0.1%	0.1%
0-90	2,756.6	99.8%	99.8%
90-180	5.9	0.2%	0.2%
0-180	2,762.5	100%	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	112.9	4.1%	90-100	0.3	0%
10-20	321.4	11.6%	100-110	0.8	0%
20-30	477.1	17.3%	110-120	1.0	0%
30-40	548.2	19.8%	120-130	1.0	0%
40-50	509.4	18.4%	130-140	1.0	0%
50-60	376.6	13.6%	140-150	0.7	0%
60-70	224.8	8.1%	150-160	0.6	0%
70-80	135.5	4.9%	160-170	0.3	0%
80-90	50.8	1.8%	170-180	0.1	0%

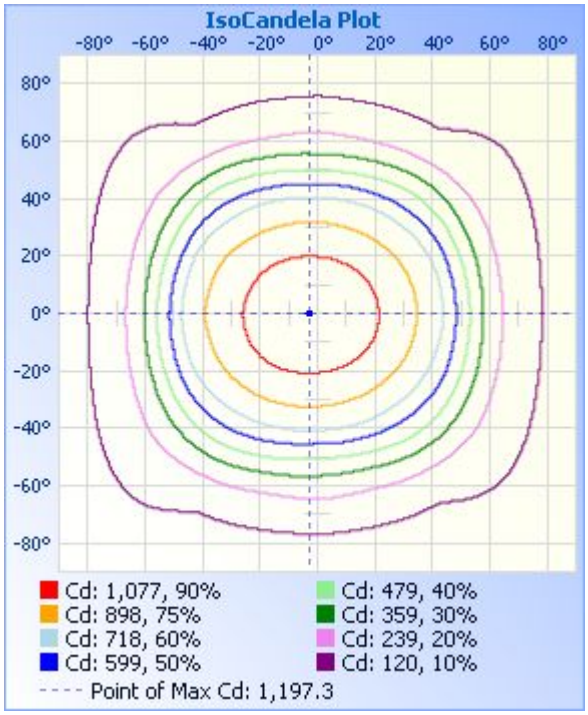
Photometric Data



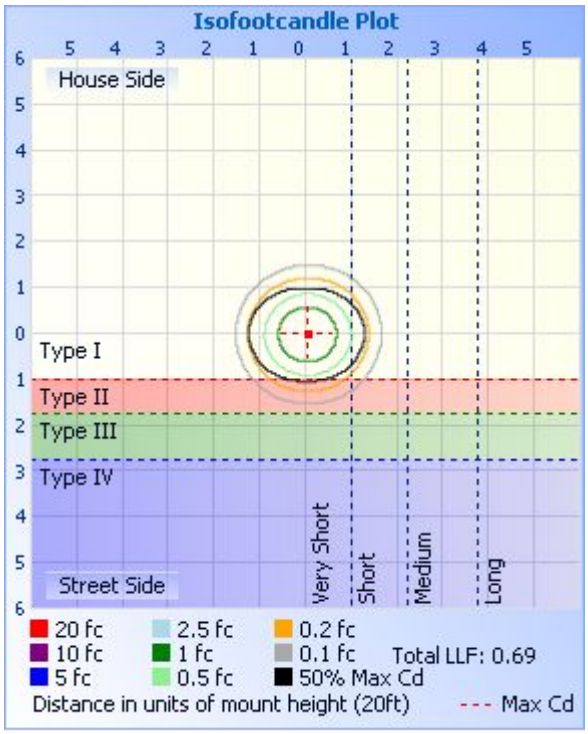
Illuminance Plots



ISOCANDELA DIAGRAM



ISOLUX DIAGRAM



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	1195	1195	1195	1195	1195	1195	1195	1195	1195	1195	1195	1195	1195	1195	1195	1195	1195
1	1195	1196	1196	1196	1196	1196	1196	1196	1195	1195	1194	1194	1194	1194	1194	1194	1195
2	1194	1195	1196	1197	1197	1197	1196	1195	1194	1194	1193	1192	1192	1192	1192	1193	1194
3	1193	1194	1196	1196	1197	1197	1196	1194	1193	1192	1191	1190	1191	1190	1190	1191	1193
4	1190	1192	1195	1196	1197	1196	1195	1193	1191	1190	1188	1187	1188	1187	1188	1188	1190
5	1188	1190	1193	1195	1196	1196	1194	1191	1188	1187	1185	1185	1185	1185	1185	1186	1188
6	1184	1188	1191	1194	1195	1194	1192	1188	1185	1183	1182	1181	1181	1181	1181	1182	1184
7	1180	1184	1189	1192	1193	1193	1190	1185	1182	1179	1178	1177	1178	1177	1177	1178	1180
8	1176	1180	1186	1190	1191	1191	1187	1182	1177	1175	1173	1173	1174	1173	1173	1173	1176
9	1170	1176	1182	1188	1189	1188	1184	1177	1172	1169	1168	1169	1169	1168	1167	1168	1170
10	1165	1171	1178	1185	1186	1185	1180	1172	1166	1163	1163	1164	1164	1163	1162	1162	1165
11	1159	1165	1174	1181	1183	1182	1176	1167	1160	1157	1157	1158	1159	1158	1156	1155	1159
12	1152	1159	1169	1177	1180	1178	1171	1160	1153	1150	1150	1152	1153	1151	1149	1149	1152
13	1144	1152	1164	1173	1176	1174	1165	1154	1146	1143	1143	1145	1147	1146	1143	1141	1144
14	1136	1146	1158	1169	1172	1170	1160	1147	1138	1135	1135	1139	1141	1139	1135	1133	1136
15	1128	1138	1151	1164	1168	1165	1153	1139	1129	1126	1127	1132	1134	1131	1127	1125	1128
16	1119	1130	1144	1158	1163	1160	1147	1131	1120	1117	1118	1124	1126	1124	1119	1116	1119
17	1110	1121	1137	1152	1158	1154	1140	1123	1111	1107	1109	1116	1119	1116	1110	1106	1110
18	1100	1111	1129	1146	1153	1148	1132	1113	1101	1097	1099	1107	1110	1107	1100	1096	1100
19	1089	1102	1121	1139	1146	1141	1124	1103	1090	1086	1089	1098	1100	1097	1090	1086	1089
20	1078	1091	1112	1131	1139	1134	1115	1093	1078	1075	1079	1088	1090	1086	1079	1074	1078
21	1066	1081	1102	1122	1132	1126	1106	1082	1067	1063	1068	1077	1078	1075	1068	1063	1066
22	1054	1069	1092	1113	1123	1117	1096	1071	1054	1051	1056	1065	1066	1062	1055	1050	1054
23	1041	1057	1081	1103	1114	1107	1085	1059	1041	1038	1043	1052	1054	1050	1042	1038	1041
24	1028	1045	1069	1092	1104	1097	1074	1046	1027	1024	1030	1039	1041	1037	1028	1024	1028
25	1014	1032	1056	1081	1094	1086	1062	1033	1012	1010	1016	1026	1028	1023	1014	1010	1014
26	999	1018	1043	1069	1082	1074	1049	1019	997	995	1000	1012	1015	1010	999	995	999
27	984	1003	1030	1056	1071	1062	1036	1004	982	979	985	997	1001	995	984	980	984
28	968	988	1015	1043	1059	1049	1022	988	966	962	969	982	988	981	969	963	968

29	952	972	1001	1030	1047	1036	1007	973	950	945	952	967	974	966	953	946	952
30	935	955	985	1016	1035	1023	991	956	933	927	935	952	961	951	937	929	935
31	917	938	969	1002	1022	1008	975	938	915	908	917	936	947	936	921	911	917
32	900	920	953	988	1010	994	958	919	897	889	899	920	934	922	904	893	900
33	881	901	937	974	997	980	940	901	878	869	880	904	920	907	887	874	881
34	862	883	920	960	984	964	922	881	859	849	861	887	905	892	869	855	862
35	841	863	903	945	971	948	904	861	839	829	841	869	890	876	852	835	841
36	821	843	886	930	958	930	884	841	818	808	821	850	874	860	833	816	821
37	800	823	868	915	943	913	863	820	796	787	799	829	857	844	814	796	800
38	778	803	849	900	927	894	842	798	773	765	776	807	839	826	793	775	778
39	756	782	830	884	911	875	819	776	750	742	752	785	821	807	772	753	756
40	733	761	808	866	894	854	796	752	726	718	728	762	800	785	748	732	733
41	710	739	784	847	877	833	772	727	701	693	704	740	778	763	723	708	710
42	687	716	760	825	859	811	748	702	675	669	682	718	754	738	698	684	687
43	662	692	735	803	840	789	725	678	649	645	660	696	730	713	674	660	662
44	638	666	710	780	819	767	702	655	622	621	639	675	705	688	650	633	638
45	612	640	685	756	796	745	680	632	595	598	618	653	679	663	627	608	612
46	586	614	660	731	771	723	659	610	570	575	597	632	652	636	605	584	586
47	559	589	637	704	744	700	638	587	546	553	577	609	625	609	582	560	559
48	533	564	615	675	715	677	618	565	523	530	556	587	598	582	560	537	533
49	507	541	592	646	685	652	596	544	501	507	536	564	571	556	537	514	507
50	482	517	570	617	654	627	574	521	479	484	514	540	546	530	514	491	482
51	458	494	547	588	626	602	552	499	459	461	491	516	521	506	491	468	458
52	437	471	523	560	598	577	529	475	438	438	468	491	497	481	468	445	437
53	415	448	499	533	571	551	506	452	418	415	443	467	473	456	444	422	415
54	395	425	474	507	545	526	482	429	399	392	419	441	447	430	420	399	395
55	376	402	449	481	519	500	457	405	380	369	395	415	420	403	397	376	376
56	357	379	424	454	492	473	432	382	361	347	371	389	393	378	373	354	357
57	340	356	399	428	464	445	407	358	343	326	348	365	368	353	348	332	340
58	323	334	374	401	435	418	382	337	326	307	326	342	344	329	324	311	323
59	306	313	348	373	407	391	359	316	310	289	305	320	324	307	300	291	306
60	290	292	323	347	380	365	335	297	295	273	285	300	304	287	277	272	290

61	276	273	297	322	354	341	313	280	280	257	265	282	286	270	255	254	276
62	262	255	274	299	330	319	292	264	267	243	247	266	270	253	235	237	262
63	248	238	251	279	309	298	272	248	255	230	229	251	254	239	217	222	248
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66	211	197	195	232	256	249	216	209	220	194	182	213	216	204	171	183	211
67	200	185	180	219	242	236	200	197	209	183	168	202	206	194	159	173	200
68	190	175	166	208	229	224	185	187	199	174	156	192	196	185	147	164	190
69	180	166	153	198	217	213	172	177	188	165	145	182	187	177	137	156	180
70	171	157	142	189	206	203	159	168	178	157	135	174	179	169	129	148	171
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72	153	142	124	172	188	183	138	151	159	141	120	156	165	154	116	134	153
73	144	135	117	163	179	174	129	142	149	132	114	148	158	146	111	127	144
74	136	128	112	155	171	165	122	134	140	124	108	140	151	139	106	121	136
75	128	122	107	147	164	156	116	126	132	117	104	132	143	132	102	114	128
76	121	115	103	140	156	147	110	118	124	110	99	123	135	124	98	107	121
77	114	108	99	132	149	139	105	111	118	103	95	116	127	117	94	101	114
78	108	101	95	124	141	130	101	103	110	96	91	108	118	109	90	94	108
79	100	93	91	116	132	121	96	95	102	88	86	100	109	102	85	87	100
80	93	86	87	109	123	112	91	87	94	81	79	92	99	94	80	80	93
81	84	78	83	101	114	103	86	79	85	73	72	84	89	86	73	73	84
82	76	71	77	92	104	94	79	71	75	65	64	76	79	77	66	66	76
83	66	63	71	84	93	85	71	63	64	57	54	66	67	68	57	58	66
84	56	56	63	75	82	75	61	54	54	49	45	56	54	57	48	50	56
85	47	48	53	64	69	64	51	46	45	40	36	43	40	44	39	42	47
86	37	40	43	53	55	52	39	37	35	31	26	29	26	30	28	32	37
87	27	31	31	41	42	40	28	27	24	21	15	15	13	15	17	23	27
88	16	21	21	28	29	27	18	16	13	11	6	4	3	4	7	12	16
89	6	10	11	13	15	13	8	5	3	1	0	0	0	0	0	2	6
90	0	1	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0

2.3 Electrical, Photometric and Chromaticity Measurements *(Refer to Work Instruction QD25)*	**IES LM-79 2008**

Test date	2014-09-09	**Test Ambient:**	25.2 ° C
Test Orientation	Horizontal	**Stabilization Time (min)**	90
Model Number	MT8Z04-6		

Electrical Measurement for Bare Lamp :

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
140805-3	120.0	60	0.09587	11.13	0.9681	10.37
	277.2	60	0.0465	11.73	0.9100	18.03

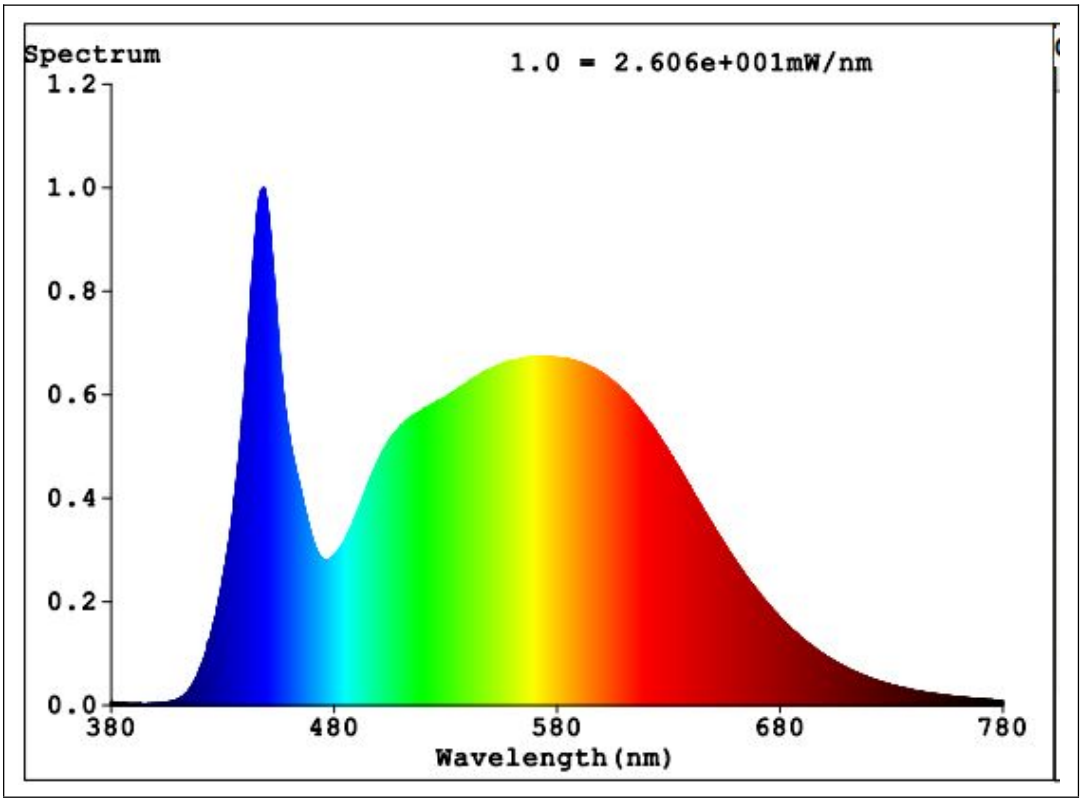
Sphere-Spectroradiometer Method for Bare Lamp:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	83.9
R9	15
CCT (K)	4986
Chromaticity (x, y)	x=0.3464 y=0.3619
Chromaticity (u', v')	u'=0.2084 v'=0.4898
Duv	0.0046
Total Initial Lumen Output(lm)	1214
Initial Lumen Efficacy(lm/w)	109.07

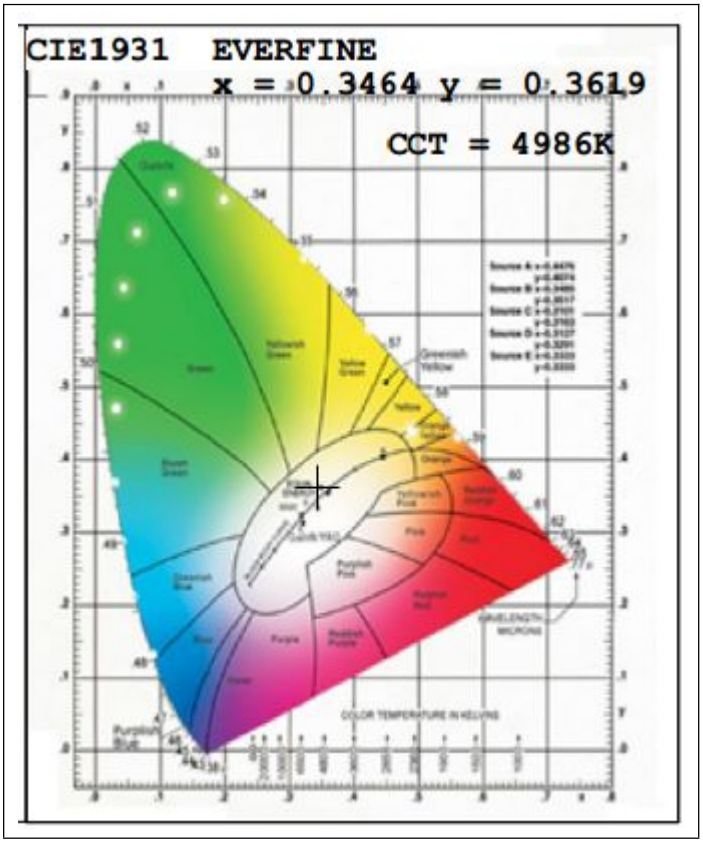
Special Color Rendering Indices			
R1	81	R9	15
R2	88	R10	71
R3	93	R11	83
R4	84	R12	63
R5	82	R13	83
R6	83	R14	96
R7	89	R15	76
R8	70	--	--

Spectral Power Distribution

Spectral Power Distribution:



Chromaticity Diagram



3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-336	2 meter Integrating Sphere	2014-07-01	2015-06-30
ST-R-331	Spectral analysis system HAAS-2000	2014-07-01	2015-06-30
D204	Standard Lamp	2014-07-01	2015-06-30
PF2010	Power Meter for Integrating Sphere	2014-07-01	2015-06-30
EE-09	Goniophotometer system	2014-07-01	2015-06-30
D908S	Standard Lamp	2014-07-01	2015-06-30
PF210	Power Meter for Goniophotometer	2014-07-01	2015-06-30
ST-R-181A	Temperature Tester	2014-07-01	2015-06-30

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