



Report No.: GZE140811

NVLAP LAB CODE 201011-0

LM-79-08 Test Report

For

MLS CO., LTD

(Brand Name: MLS)

NO.1 MULINSEN RD XIAOLAN TOWNSHIP

ZHONGSHAN, GUANGDONG CHINA

Four-Foot Linear Replacement Lamps

Model name(s): MT8Z04

Representative (Tested) Model: MT8Z04

Model Difference: N/A

Test & Report By:

Sean Zhuo

Engineer: Sean Zhuo

Date: Aug.27,2014

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.

Laboratory: Standard-Tech Co. Ltd Testing Center

NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: 8th floor, Block B, No. 11 Caipin Road, Guangzhou Science City, Tianhe, Guangzhou 510663, China

Tel: 8620-3229 0320

Fax: 8620-32290422

<http://www.standard-tech.com>

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	Aug.20,2014
Test Report No.	GZE140811
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	MLS CO., LTD	
Brand Name	MLS	
Model Number	MT8Z04	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Four-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	Goniophotometer	
	Output	Output	
Input Wattage	18.65	--	W
Input Current	0.1596	--	A
Input Voltage (ac)	120.1	--	V
Power Factor	0.9728	--	
Off-State Power	0	--	W
Photometric Characteristics			
Total Initial Lumen Output	2102	--	lm
Initial Lumen Efficacy	112.71	--	lm/w
Correlated color temperature / CCT	4881	--	K
Color rendering index / CRI	83.5	--	
R9 Value	12	--	
Duv	0.0056	--	
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			%

Laboratory: Standard-Tech Co. Ltd Testing Center

NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: 8th floor, Block B, No. 11 Caipin Road, Guangzhou Science City, Tianhe, Guangzhou 510663, China

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

Test Specifications:	
Date of Receipt	: Aug.25, 2014
Date of Test	: Aug.26, 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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 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.

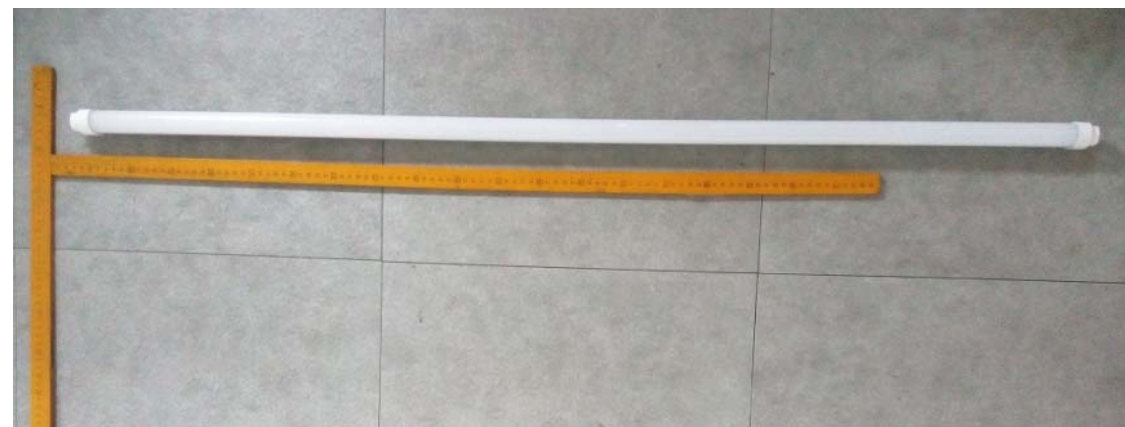
2. Photometric and Electrical Measurements – Integrating Sphere Method:

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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	MT8Z04
Luminaire Type	Four-Foot Linear Replacement Lamps
Rated Voltage / Frequency	100 ~ 277 Vac, 60 Hz
Nominal Power	19W
Rated Initial Lamp Lumen	--
Declared CCT	5000K
LED Manufacturer	MLS
LED Model	E2835US28
Sample Receipt Date	Aug.25, 2014
Sample Number	140811-1,2

Photo



Laboratory: Standard-Tech Co. Ltd Testing Center
NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: 8th floor, Block B, No. 11 Caipin Road, Guangzhou Science City, Tianhe, Guangzhou 510663, China

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

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

Test date	2014-08-27	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	MT8Z04		

Electrical Measurement for Bare Lamp :

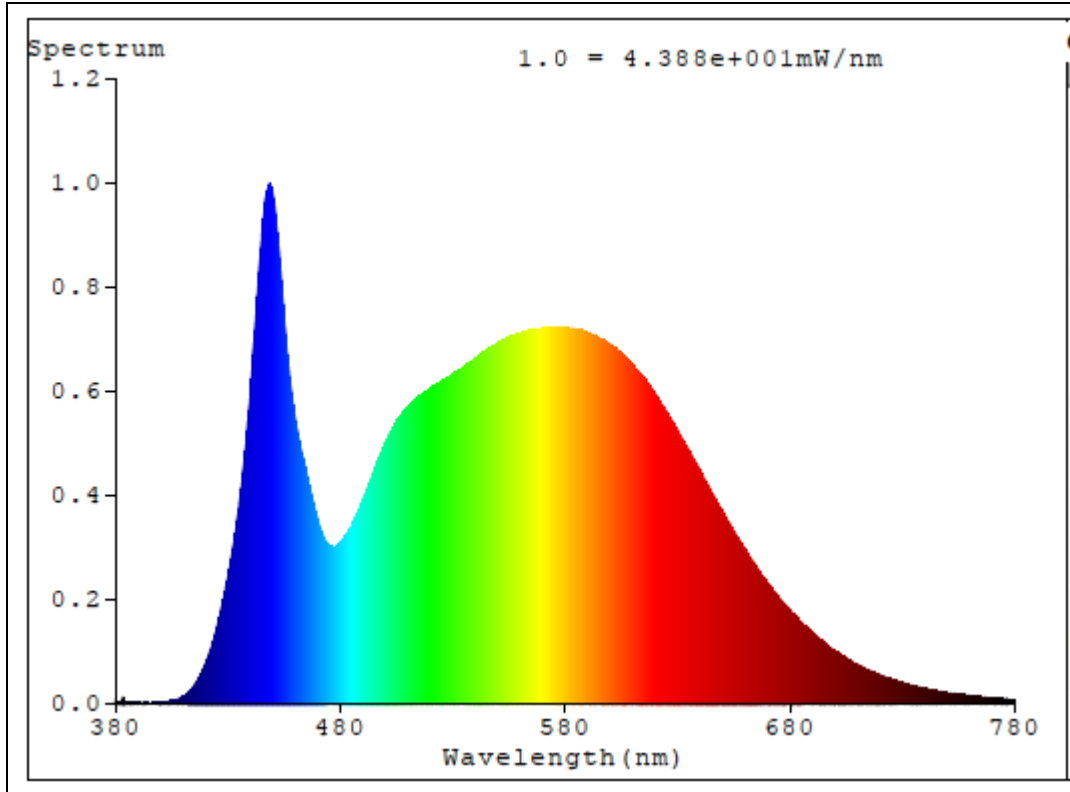
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
140811-1	120.1	60	0.1596	18.65	0.9728	11.47
	277.0	60	0.0761	19.20	0.9108	16.33

Sphere-Spectroradiometer Method for Bare Lamp:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.1	R1	81	R9	12
Frequency (Hz)	60	R2	88	R10	71
Color Rendering Index (CRI)	83.5	R3	94	R11	82
R9	12	R4	83	R12	63
CCT (K)	4881	R5	81	R13	82
Chromaticity (x, y)	x=0.3499 y=0.3668	R6	83	R14	97
Chromaticity (u', v')	u'=0.2088 v'=0.4926	R7	89	R15	75
Duv	0.0056	R8	69	--	--
Total Initial Lumen Output(lm)	2102				
Initial Lumen Efficacy(lm/w)	112.71				

Spectral Power Distribution

Spectral Power Distribution:



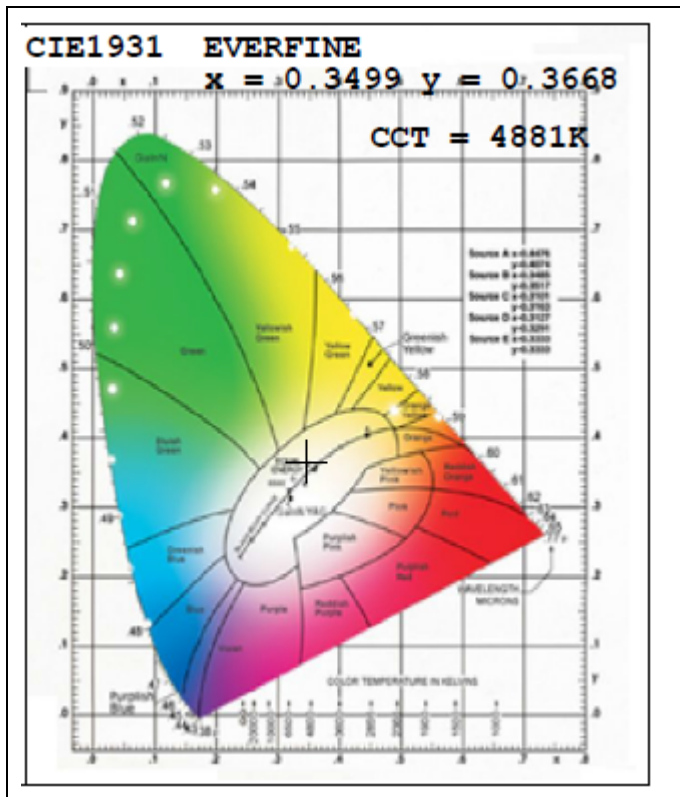
Laboratory: Standard-Tech Co. Ltd Testing Center
NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: 8th floor, Block B, No. 11 Caipin Road, Guangzhou Science City, Tianhe, Guangzhou 510663, China

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

Chromaticity Diagram



Laboratory: Standard-Tech Co. Ltd Testing Center
NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: 8th floor, Block B, No. 11 Caipin Road, Guangzhou Science City, Tianhe, Guangzhou 510663, China

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

2.2 Electrical, Photometric and Chromaticity Measurements (Refer to Work Instruction QD25)
--

IES LM-79 2008

Test date	2014-08-27	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	MT8Z04		

Electrical Measurement for 2-lamp in Luminaire Fixture Lithonia 2PM3N 12 cell 2x4 parabolic:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
140811-1,2	120.0	60	0.3201	37.33	0.9718	10.79
	277.2	60	0.1509	38.17	0.9125	16.25

Color Data for 2-lamp in Luminaire Fixture Lithonia 2PM3N 12 cell 2x4 parabolic:

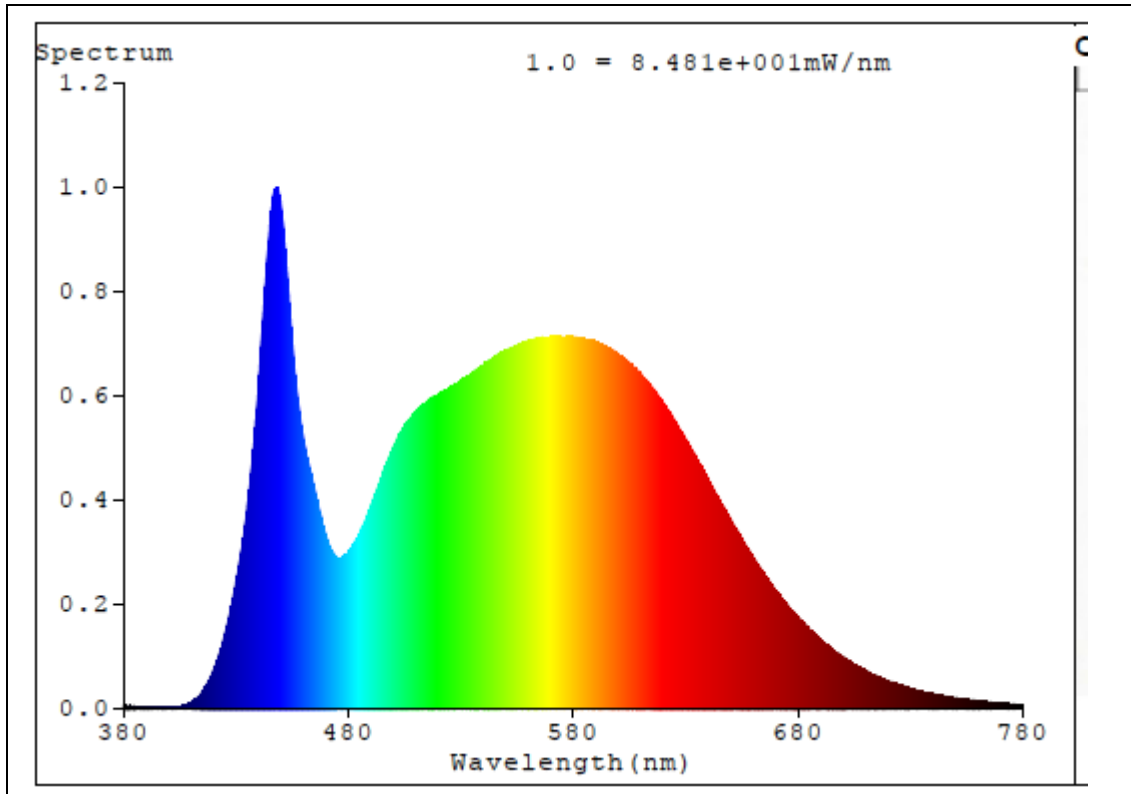
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	11
Frequency (Hz)	60	R2	87	R10	71
Color Rendering Index (CRI)	83.3	R3	93	R11	82
R9	11	R4	83	R12	63
CCT (K)	4891	R5	81	R13	82
Chromaticity (x, y)	x=0.3497 y=0.3674	R6	83	R14	97
Chromaticity (u', v')	u'=0.2085 v'=0.4928	R7	89	R15	75
Duv	0.0059	R8	69	--	--

Goniophotometer Method in Luminaire Fixture Lithonia 2PM3N 12 cell 2x4 parabolic:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	3252.5
Luminous Efficacy (lm/W)	87.16
Beam Angle°	112.1
Center Beam Candle Power (cd)	1204
S/MH(C0/180)	1.38
S/MH(C90/270)	1.20

Spectral Power Distribution

Spectral Power Distribution:



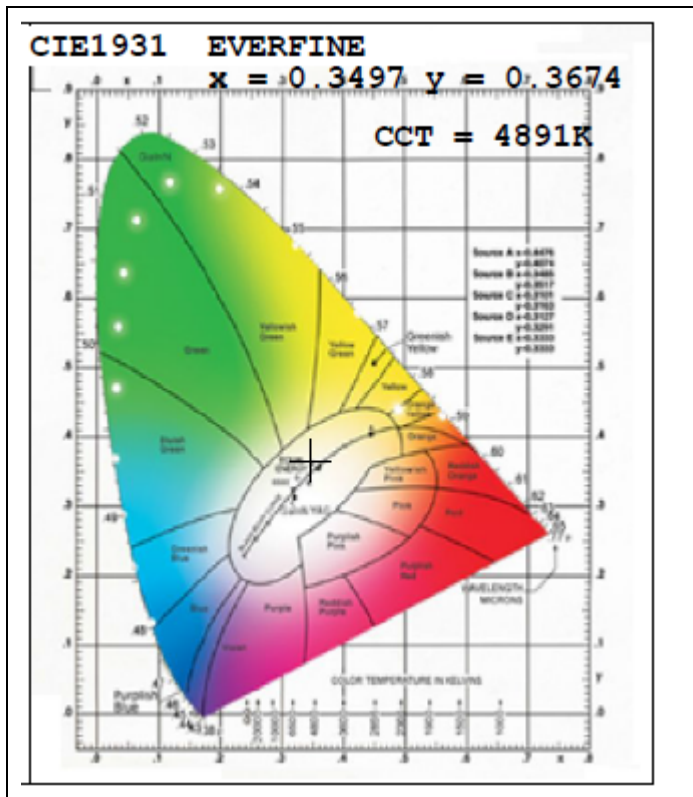
Laboratory: Standard-Tech Co. Ltd Testing Center
NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: 8th floor, Block B, No. 11 Caipin Road, Guangzhou Science City, Tianhe, Guangzhou 510663, China

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

Chromaticity Diagram



Laboratory: Standard-Tech Co. Ltd Testing Center
NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: 8th floor, Block B, No. 11 Caipin Road, Guangzhou Science City, Tianhe, Guangzhou 510663, China

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

Zonal Lumen Tabulation

Zonal Lumen Summary			
Zone	Lumens	% Lamp	% Luminaire
0-30	928.0	28.5%	28.5%
0-40	1,544.5	47.5%	47.5%
0-60	2,865.5	88.1%	88.1%
60-90	385.0	11.8%	11.8%
70-100	90.0	2.8%	2.8%
90-120	0.9	0%	0%
0-90	3,250.5	99.9%	99.9%
90-180	2.2	0.1%	0.1%
0-180	3,252.7	100%	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	112.7	3.5%	90-100	0.0	0%
10-20	322.0	9.9%	100-110	0.3	0%
20-30	493.3	15.2%	110-120	0.5	0%
30-40	616.5	19.0%	120-130	0.3	0%
40-50	686.7	21.1%	130-140	0.3	0%
50-60	634.3	19.5%	140-150	0.3	0%
60-70	295.1	9.1%	150-160	0.2	0%
70-80	78.1	2.4%	160-170	0.2	0%
80-90	11.8	0.4%	170-180	0.1	0%

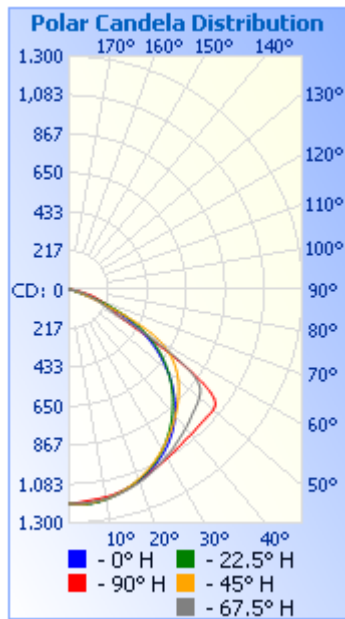
Laboratory: Standard-Tech Co. Ltd Testing Center
NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

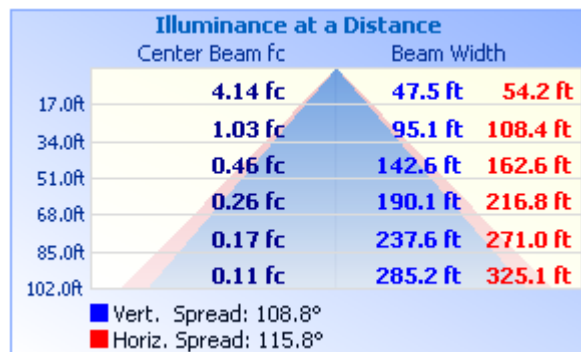
Address: 8th floor, Block B, No. 11 Caipin Road, Guangzhou Science City, Tianhe, Guangzhou 510663, China

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

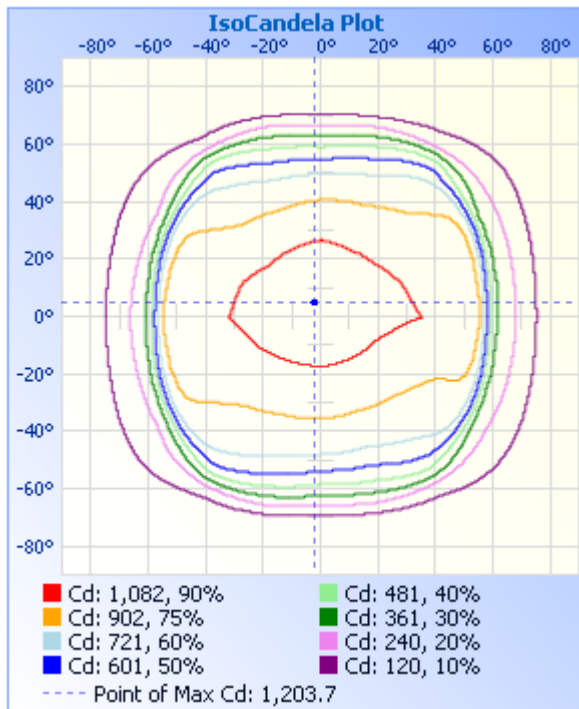
Photometric Data



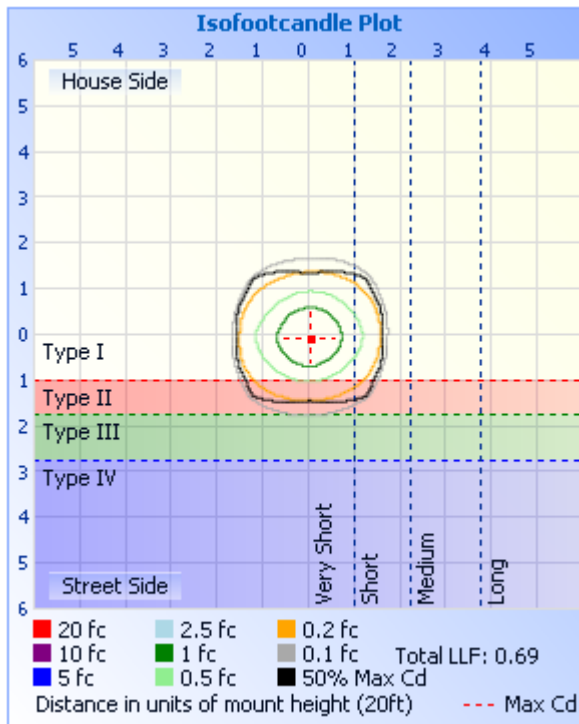
Illuminance Plots



ISOCANDELA DIAGRAM



ISOLUX DIAGRAM



Laboratory: Standard-Tech Co. Ltd Testing Center

NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: 8th floor, Block B, No. 11 Caipin Road, Guangzhou Science City, Tianhe, Guangzhou 510663, China

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

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	1196	1196	1196	1196	1196	1196	1196	1196	1196	1196	1196	1196	1196	1196	1196	1196	1196
1	1199	1200	1199	1199	1196	1196	1196	1195	1193	1193	1192	1193	1196	1195	1196	1198	1199
2	1200	1202	1201	1200	1193	1195	1194	1192	1190	1188	1188	1189	1195	1193	1195	1198	1200
3	1202	1204	1202	1199	1190	1191	1190	1188	1185	1183	1183	1185	1194	1191	1194	1198	1202
4	1202	1204	1201	1198	1188	1188	1186	1184	1180	1177	1178	1181	1192	1190	1193	1197	1202
5	1201	1204	1200	1196	1185	1184	1181	1179	1174	1171	1173	1177	1191	1188	1191	1195	1201
6	1201	1203	1198	1194	1183	1180	1176	1173	1168	1164	1167	1173	1190	1187	1189	1193	1201
7	1199	1201	1196	1193	1182	1176	1170	1167	1162	1157	1162	1169	1188	1186	1188	1191	1199
8	1196	1198	1194	1191	1181	1172	1164	1159	1155	1150	1157	1165	1187	1184	1186	1188	1196
9	1193	1195	1191	1189	1179	1169	1158	1152	1147	1142	1151	1160	1185	1182	1184	1183	1193
10	1189	1191	1188	1187	1178	1165	1152	1144	1139	1135	1145	1155	1181	1179	1181	1179	1189
11	1185	1187	1184	1185	1176	1161	1146	1136	1131	1128	1138	1149	1178	1177	1177	1174	1185
12	1180	1182	1180	1183	1173	1157	1139	1128	1123	1120	1131	1142	1173	1174	1173	1169	1180
13	1175	1176	1175	1179	1170	1152	1133	1119	1115	1112	1123	1136	1168	1170	1168	1164	1175
14	1171	1171	1170	1175	1166	1146	1126	1110	1106	1104	1115	1129	1163	1166	1163	1159	1171
15	1165	1165	1165	1171	1162	1141	1119	1102	1099	1096	1107	1122	1159	1161	1157	1153	1165
16	1160	1159	1158	1166	1157	1135	1112	1093	1090	1088	1098	1114	1154	1157	1151	1147	1160
17	1155	1153	1151	1162	1152	1129	1104	1085	1081	1080	1090	1107	1149	1152	1145	1141	1155
18	1149	1146	1144	1157	1147	1123	1095	1076	1073	1071	1081	1100	1145	1148	1138	1135	1149
19	1142	1140	1137	1152	1142	1117	1087	1067	1064	1062	1072	1092	1140	1143	1132	1129	1142
20	1136	1132	1128	1147	1137	1111	1079	1059	1055	1054	1063	1084	1135	1137	1125	1123	1136
21	1130	1125	1120	1141	1132	1105	1071	1050	1046	1044	1054	1076	1130	1132	1118	1116	1130
22	1123	1117	1112	1135	1127	1098	1061	1041	1037	1035	1045	1068	1126	1126	1111	1109	1123
23	1115	1109	1103	1129	1122	1091	1053	1032	1027	1025	1036	1059	1122	1120	1104	1102	1115
24	1107	1100	1094	1122	1116	1085	1045	1023	1018	1016	1026	1051	1119	1114	1097	1094	1107
25	1100	1091	1085	1115	1111	1077	1036	1014	1008	1006	1017	1043	1114	1109	1089	1086	1100
26	1092	1082	1076	1108	1107	1070	1028	1005	998	995	1007	1035	1110	1103	1082	1078	1092
27	1083	1072	1066	1101	1102	1063	1019	995	988	985	997	1027	1106	1098	1074	1069	1083
28	1073	1061	1056	1094	1099	1056	1010	985	979	974	987	1019	1102	1092	1066	1060	1073
29	1064	1049	1045	1088	1095	1049	1001	975	968	963	977	1010	1098	1087	1058	1051	1064

Laboratory: Standard-Tech Co. Ltd Testing Center

NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: 8th floor, Block B, No. 11 Caipin Road, Guangzhou Science City, Tianhe, Guangzhou 510663, China

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

30	1054	1037	1035	1081	1091	1043	991	965	958	952	967	1003	1095	1081	1049	1041	1054
31	1043	1025	1023	1074	1086	1037	982	954	948	942	957	995	1092	1076	1041	1031	1043
32	1032	1013	1012	1067	1082	1030	972	944	937	930	947	987	1090	1071	1033	1021	1032
33	1019	999	1002	1060	1079	1024	963	934	927	918	937	980	1087	1065	1025	1010	1019
34	1007	985	991	1053	1074	1017	953	923	916	906	926	972	1084	1060	1016	999	1007
35	994	971	980	1045	1070	1011	944	912	904	895	916	965	1082	1055	1008	988	994
36	980	957	968	1039	1067	1005	936	901	893	883	906	958	1078	1051	999	976	980
37	966	942	957	1032	1063	999	927	891	880	870	895	951	1075	1046	990	963	966
38	951	927	945	1025	1061	994	918	879	868	858	884	944	1073	1041	980	950	951
39	935	912	934	1018	1060	988	909	868	855	845	874	937	1071	1038	972	937	935
40	919	897	922	1011	1058	982	901	857	842	831	862	931	1070	1034	962	923	919
41	901	881	910	1005	1056	977	893	846	829	817	851	925	1070	1031	953	909	901
42	884	864	898	998	1053	972	884	834	815	803	840	919	1072	1027	943	894	884
43	865	848	886	990	1052	966	876	823	801	788	828	913	1074	1023	933	879	865
44	846	831	874	983	1050	961	867	811	785	773	816	908	1076	1019	923	863	846
45	827	814	862	976	1049	956	858	798	769	757	804	902	1078	1017	913	847	827
46	807	797	849	971	1048	951	849	786	753	741	793	898	1078	1014	902	830	807
47	787	779	836	965	1048	947	840	772	735	724	780	893	1079	1011	891	813	787
48	765	761	823	960	1049	942	831	759	716	707	768	888	1079	1008	880	795	765
49	744	742	810	953	1049	939	821	744	697	689	755	883	1078	1003	868	777	744
50	721	723	796	946	1048	933	811	728	677	670	742	876	1077	999	855	758	721
51	698	705	781	938	1046	927	799	711	656	651	728	869	1074	992	842	738	698
52	675	685	765	929	1036	920	787	694	634	631	714	859	1066	985	829	718	675
53	651	664	749	915	1014	910	774	676	611	611	699	847	1045	973	813	697	651
54	627	643	732	894	975	894	760	656	587	591	683	831	992	959	797	676	627
55	602	621	715	861	913	868	743	635	562	569	665	805	908	935	779	654	602
56	577	599	695	812	828	826	724	612	536	547	644	757	800	890	758	632	577
57	550	575	674	747	725	767	701	588	510	523	620	687	678	819	734	608	550
58	523	550	651	664	610	688	675	562	482	499	594	600	552	724	707	583	523
59	495	524	625	569	504	596	645	534	452	472	564	506	440	616	676	557	495
60	466	497	595	472	416	497	612	503	421	443	532	410	380	505	643	528	466
61	435	469	561	385	353	404	573	470	389	413	497	329	362	403	606	496	435

Laboratory: Standard-Tech Co. Ltd Testing Center
 NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: 8th floor, Block B, No. 11 Caipin Road, Guangzhou Science City, Tianhe, Guangzhou 510663, China

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

62	403	440	518	318	313	332	528	434	355	381	455	289	347	338	566	462	403
63	369	409	467	270	292	279	473	395	320	347	400	273	330	316	516	425	369
64	335	377	407	239	279	246	408	354	285	311	338	257	312	298	453	387	335
65	301	344	342	222	266	230	339	313	249	274	274	240	293	279	382	349	301
66	265	309	274	208	251	216	268	271	212	237	212	223	274	260	307	309	265
67	232	272	216	195	236	202	207	230	175	201	163	206	256	241	238	270	232
68	199	236	170	181	222	188	161	189	141	165	141	189	237	221	188	233	199
69	167	201	138	167	207	174	131	150	109	132	125	173	219	202	164	196	167
70	135	165	117	154	193	160	112	114	84	101	110	157	201	184	144	160	135
71	108	131	102	141	178	147	98	83	68	76	95	141	184	167	126	126	108
72	88	98	89	128	164	133	85	65	56	61	81	127	168	149	108	97	88
73	72	76	77	115	150	120	73	54	47	51	69	113	152	133	93	78	72
74	59	61	66	103	137	107	62	45	39	43	58	99	137	117	79	65	59
75	48	50	56	92	124	95	53	38	33	36	49	86	117	102	66	54	48
76	40	41	47	81	110	84	45	32	27	30	41	73	100	88	56	45	40
77	32	34	40	70	95	72	39	27	23	26	35	61	85	73	48	37	32
78	27	28	34	59	82	61	34	23	19	21	29	52	73	62	41	31	27
79	22	23	29	50	71	52	29	19	15	17	25	43	61	52	35	25	22
80	18	19	25	42	60	44	24	16	13	14	20	35	51	43	29	21	18
81	15	16	21	35	51	37	20	13	10	11	17	29	42	35	24	17	15
82	12	13	17	29	42	30	17	10	8	9	13	23	34	28	19	14	12
83	9	10	14	23	35	24	14	8	6	7	10	18	27	22	15	11	9
84	7	8	11	19	28	19	10	6	4	5	8	14	21	17	12	8	7
85	5	6	9	15	22	15	8	4	2	3	5	10	15	12	9	6	5
86	3	4	6	11	17	11	5	2	1	2	3	6	10	8	6	4	3
87	2	2	4	7	12	7	3	1	0	1	1	4	6	5	3	2	2
88	1	1	2	4	7	4	1	0	0	0	0	1	2	2	2	1	1
89	0	0	1	2	3	2	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Laboratory: Standard-Tech Co. Ltd Testing Center
 NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: 8th floor, Block B, No. 11 Caipin Road, Guangzhou Science City, Tianhe, Guangzhou 510663, China

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

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

******* END OF DATASHEET PACKAGE *******