

## LM-79-08 Test Report

For

### ETI Solid State Lighting (Zhuhai) Ltd

No.1, Zhongzhu Road South, Science & Technology Innovation Coast, High Tech District, Zhuhai City,  
Guangdong Prov., China

### High Bay

Model Name(s):

502402##

Representative (Tested) Model:

50240261

**Model Difference: ##-61-70, identifies 5000K**

Prepare by:

*Derek Lai*

Engineer: Derek Lai

Date: 2019-08-20

Review by:

*Vincent Yuan*

Technical Lead: Vincent Yuan

Issue Date: 2019-08-23

Revised Date: N/A

- Note:
1. The results contained in this report pertain only to the tested samples.
  2. This report shall not be reproduced, no limited part or full, without approval of Dongguan New Testing Centre Co., Ltd
  3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency of the Federal Government.

**Product Information:**

Client Name:	ETI Solid State Lighting (Zhuhai) Ltd
Brand Name:	ETI
Model Number:	502402##(##=61-70)
Product Type:	High Bay Luminaires for Commercial and Industrial Buildings
Rating Input:	120-277Vac, 50/60Hz, 138W
Declared CCT:	5000 K
Declared Light Output:	18000 lm
LED Manufacturer:	Samsung
LED Model:	SPMWH1228FD5WARMXX
LED Quantity:	544 pcs
Driver Manufacturer:	ECU ELECTRONICS INDUSTRIAL CO., LTD
Driver Model:	YX-138-680mA

**Test Information:**

Standard Lamp:	Total Spectral Radiant Flux Standard Lamp, trace to NIST. 1. D908S for Gonio 2. D215S for Integrating Sphere
Date of Receipt Samples:	2019-07-23
Quantity of Receipt Samples:	1 pcs
Sample Number:	190723002-S1

**Laboratory Information:**

Test Laboratory:	Dongguan New Testing Centre Co., Ltd
Laboratory Address:	3F, No. 1 the 1 <sup>st</sup> North Industry Road, Songshan Lake Science & Technology Park, Dongguan, Guangdong, China
Laboratory Contact Name:	Neil Zhong
Laboratory Contact E-mail:	<a href="mailto:Neil_ntc@163.com">Neil_ntc@163.com</a>

**Report Information:**

Issued Date of Test Report:	2019-08-23
Revised Date of Test Report:	N/A
Test Report No.:	NTCLR19080078
Remark (If applicable):	N/A

<b>Test Specification:</b>	
Date of Test	2019-07-26
Test Item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. THD and PF
Reference Standard	IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products ANSI C78.377-2017 Specifications for the Chromaticity of Solid State Lighting Products CIE 13.3-1995 Method of Measuring and Specifying Color Rendering Properties of Light Sources CIE 15-2004 Technical Report Colorimetry

<b>Test Methods:</b>
<p><b>1. Photometric and Electrical Measurements – Light Distribution Method:</b></p> <p>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 required Voltage and Frequency. It was stabilized before measurement was made. Luminous Flux, Luminaire Efficacy and Zonal Lumen were calculated from the software taken at 1° vertical intervals and 15° horizontal intervals.</p>
<p><b>2. Photometric and Electrical Measurements – Integrating Sphere Method:</b></p> <p>Photometric parameters were measured using an integrating sphere, as spectroradiometer and software. The ambient temperature condition inside the sphere was measured at 25 °C± 1°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 require Voltage and Frequency. 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 1 nm intervals over the rage of 380 to 780 nm.</p>
<p><b>3. THD and PF Measurements:</b></p> <p>The sample was tested according to the ANSI C82.77-2002, the sample was operated at requirement Voltage and Frequency, and was stabilized before measurement. The Total Harmonic Distortion was calculated from the Digital Power Meter.</p>

**Integrating Sphere Test Results:**

**Test Condition:**

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
24.7	40.9	Face Down	90	10

**Electrical Data:**

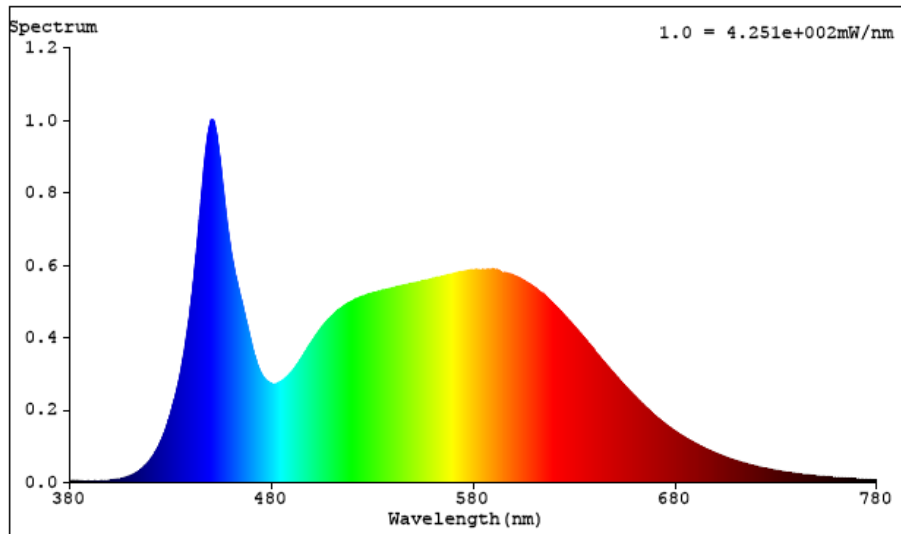
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	1.148	137.3	0.9969

**Color Data:**

Parameter	Result
CCT(K)	5252
Ra	86.5
R9	25
Chromaticity, x	0.3384
Chromaticity, y	0.3453
Chromaticity, u'	0.2093
Chromaticity, v'	0.4806
Duv	-0.0004

Special Color Rendering			
R1	86	R9	25
R2	91	R10	77
R3	93	R11	87
R4	87	R12	68
R5	87	R13	87
R6	87	R14	96
R7	89	R15	82
R8	73	-	-

**Spectrum Diagram:**



**Goniophotometer Test Results:**

**Test Condition:**

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
24.7	40.9	Face Down	90	25

**Electrical Data:**

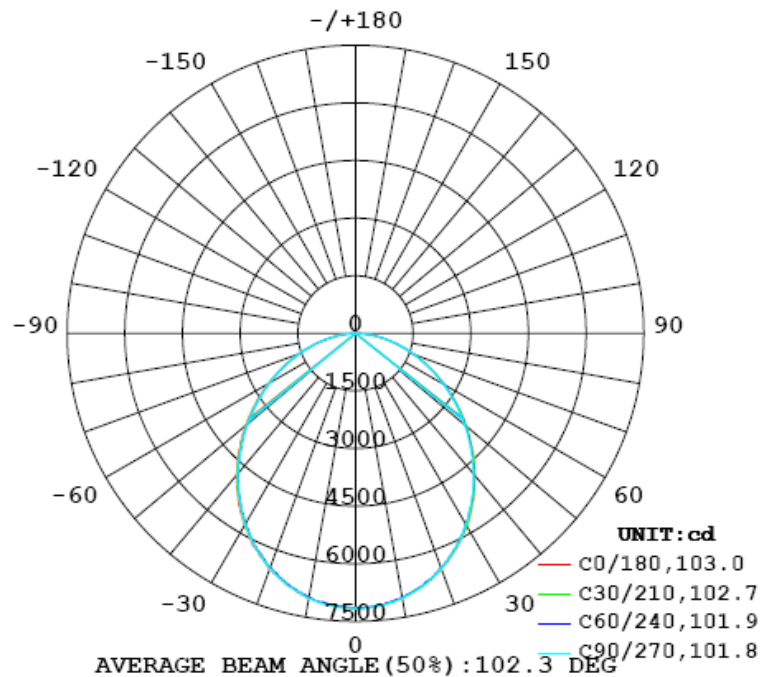
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	1.148	137.3	0.9969

**Goniophotometer Data:**

Parameter	Results
Total Luminous (lm)	18427.5
Luminous Efficacy (lm/w)	134.21
Zonal Lumens Distribution (20-50°)	51.2%
Beam Angle (°)	102.3

**Luminous Intensity Distribution Diagram:**

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM

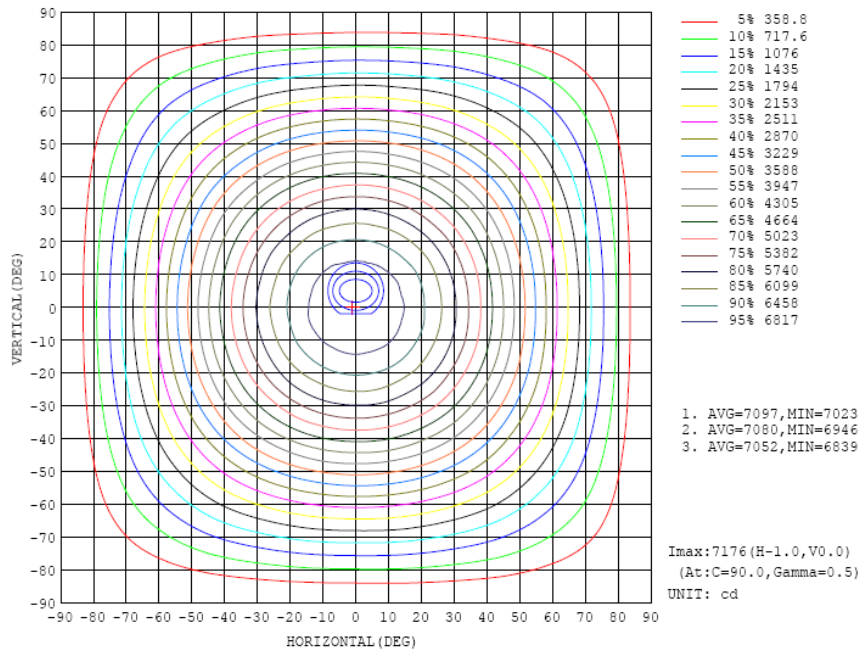


**Zonal Flux Diagram:**

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	zone	total	lum, lamp
10	6990	6985	6998	7005	6987	6971	7011	7002	0- 10	675.2	675.2	3.66, 3.66
20	6530	6496	6509	6512	6543	6505	6524	6509	10- 20	1913	2589	14, 14
30	5778	5759	5735	5763	5762	5715	5748	5754	20- 30	2837	5426	29.4, 29.4
40	4834	4810	4769	4788	4827	4744	4759	4796	30- 40	3308	8733	47.4, 47.4
50	3756	3744	3705	3700	3735	3680	3680	3716	40- 50	3286	12019	65.2, 65.2
60	2666	2664	2631	2618	2618	2584	2590	2633	50- 60	2832	14851	80.6, 80.6
70	1617	1643	1610	1598	1577	1543	1575	1594	60- 70	2080	16932	91.9, 91.9
80	675.6	724.0	699.1	675.3	629.4	630.3	667.6	684.0	70- 80	1185	18117	98.3, 98.3
90	3.706	0.3553	0.3656	0.3670	1.026	1.065	1.035	1.236	80- 90	294.6	18411	99.9, 99.9
100	0.7541	0.7347	0.7141	0.7590	1.720	1.772	1.749	1.730	90-100	1.120	18413	99.9, 99.9
110	1.088	0.9423	1.073	1.064	2.035	2.011	2.109	2.005	100-110	1.509	18414	99.9, 99.9
120	1.717	1.450	1.542	1.618	2.413	2.316	2.317	2.248	110-120	1.744	18416	99.9, 99.9
130	2.429	2.556	2.219	2.743	3.273	4.248	3.318	4.054	120-130	2.193	18418	99.9, 99.9
140	2.938	3.059	3.447	3.170	4.049	4.974	5.488	4.824	130-140	2.739	18421	100, 100
150	3.330	3.229	3.518	3.504	4.924	5.612	5.967	5.682	140-150	2.629	18423	100, 100
160	3.943	3.893	3.396	4.034	5.853	6.153	5.796	6.091	150-160	2.163	18426	100, 100
170	4.507	4.479	4.277	4.451	5.695	6.103	6.075	5.913	160-170	1.429	18427	100, 100
180	5.271	5.352	5.247	5.225	5.256	5.353	5.257	5.222	170-180	0.4956	18428	100, 100
DBG	LUMINOUS INTENSITY:cd Less than 35% Percent = 14.0 %									UNIT:lm		

**Isocandela Diagram:**



**Luminous Distribution Intensity Data:**

Table--1 UNIT: cd

C (DEG)																					
γ (DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270		
0	7152	7152	7152	7152	7152	7152	7152	7152	7152	7152	7152	7152	7152	7152	7152	7152	7152	7152	7152	7152	
5	7094	7107	7114	7132	7099	7129	7105	7115	7118	7140	7103	7143	7125	7137	7119	7098	7079	7111	7134		
10	6990	7009	6987	6985	6974	7004	6998	6973	6982	7005	6990	7005	6987	7004	6979	6971	6983	7003	7011		
15	6801	6784	6800	6789	6789	6797	6776	6800	6773	6780	6779	6820	6788	6766	6790	6755	6753	6797	6808		
20	6530	6547	6511	6496	6481	6524	6509	6487	6487	6512	6500	6542	6543	6497	6514	6505	6494	6502	6524		
25	6185	6188	6194	6167	6161	6171	6145	6147	6131	6161	6188	6182	6178	6154	6161	6154	6129	6130	6165		
30	5778	5792	5778	5759	5744	5765	5735	5738	5733	5763	5740	5779	5762	5745	5764	5715	5717	5734	5748		
35	5333	5347	5333	5303	5291	5303	5266	5277	5268	5287	5283	5314	5322	5275	5264	5255	5247	5260	5268		
40	4834	4857	4822	4810	4786	4799	4769	4782	4773	4788	4781	4819	4827	4779	4796	4744	4746	4754	4759		
45	4311	4324	4305	4290	4241	4257	4247	4249	4233	4254	4243	4287	4286	4244	4257	4213	4188	4215	4229		
50	3756	3777	3758	3744	3723	3729	3705	3703	3690	3700	3704	3743	3735	3709	3696	3680	3660	3660	3680		
55	3212	3236	3217	3197	3180	3184	3166	3157	3145	3159	3163	3174	3171	3153	3150	3115	3120	3116	3113		
60	2666	2688	2681	2664	2651	2646	2631	2617	2608	2618	2613	2624	2618	2603	2593	2584	2578	2579	2590		
65	2134	2161	2145	2140	2123	2129	2110	2111	2085	2099	2077	2091	2088	2057	2071	2049	2056	2053	2058		
70	1617	1656	1631	1643	1628	1636	1610	1615	1583	1598	1573	1583	1577	1543	1565	1543	1558	1556	1565		
75	1132	1168	1156	1168	1158	1162	1141	1140	1120	1119	1093	1094	1090	1060	1081	1070	1087	1084	1103		
80	676	707	704	724	715	720	699	700	680	675	640	633	629	606	627	630	652	649	668		
85	255	287	283	303	296	290	274	251	256	243	215	211	213	193	216	217	236	237	255		
90	3.71	0.37	1.06	0.36	0.46	0.36	0.37	0.36	0.37	0.37	0.38	0.37	1.03	1.08	1.05	1.06	1.05	1.06	1.06		
95	0.57	0.56	0.61	0.49	0.49	0.49	0.50	0.49	0.50	0.52	0.61	0.55	1.42	1.43	1.46	1.40	1.36	1.37	1.35		
100	0.75	0.69	0.70	0.73	0.71	0.70	0.71	0.72	0.74	0.76	0.73	0.70	1.72	1.71	1.71	1.77	1.75	1.76	1.75		
105	0.93	0.93	0.82	0.83	0.86	0.89	0.90	0.91	0.92	0.90	0.88	1.05	1.95	2.15	1.92	1.98	2.00	2.05	2.04		
110	1.09	1.11	0.97	0.94	0.99	1.04	1.07	1.08	1.09	1.06	1.06	1.20	2.04	2.22	1.99	2.01	2.05	2.10	2.11		
115	1.35	1.33	1.23	1.15	1.19	1.24	1.27	1.28	1.30	1.29	1.48	1.45	2.12	2.29	2.11	2.08	2.10	2.14	2.16		
120	1.72	1.63	1.90	1.45	1.49	1.47	1.54	1.57	1.59	1.62	2.05	1.76	2.41	2.56	3.07	2.32	2.29	2.29	2.32		
125	2.05	1.90	2.15	2.05	1.66	1.63	1.87	1.87	1.91	2.36	2.29	1.98	2.79	2.73	3.31	3.00	2.71	2.72	2.76		
130	2.43	2.37	2.50	2.56	2.39	2.25	2.22	2.23	2.55	2.74	2.58	2.30	3.27	3.46	3.61	4.25	3.47	3.33	3.32		
135	2.71	2.69	2.78	2.80	3.00	3.09	3.02	3.06	3.10	2.97	2.78	2.70	3.68	3.90	4.22	4.57	4.99	4.64	4.28		
140	2.94	2.95	2.85	3.06	3.25	3.40	3.45	3.37	3.30	3.17	2.97	2.93	4.05	4.27	4.54	4.97	5.14	5.41	5.49		
145	3.11	3.16	3.00	3.21	3.36	3.49	3.52	3.53	3.45	3.32	2.96	3.13	4.48	4.67	4.59	5.31	5.50	5.59	5.67		
150	3.33	3.40	3.43	3.23	3.34	3.52	3.52	3.53	3.52	3.50	3.29	3.29	4.92	5.07	5.26	5.61	5.82	5.93	5.97		
155	3.59	3.68	3.81	3.42	3.35	3.66	3.54	3.70	3.68	3.53	3.78	3.56	5.33	5.42	5.82	5.60	5.95	6.14	6.13		
160	3.94	4.00	4.00	3.89	3.53	3.46	3.40	3.64	3.80	4.03	3.97	3.88	5.85	5.81	6.00	6.15	5.92	5.91	5.80		
165	4.18	4.25	4.25	4.22	3.96	3.97	3.97	4.13	4.28	4.29	4.19	4.16	5.71	5.76	6.00	6.24	6.28	6.21	6.19		
170	4.51	4.55	4.53	4.48	4.13	4.17	4.28	4.19	4.43	4.45	4.39	4.49	5.69	5.84	5.95	6.10	6.14	5.99	6.07		
175	5.01	5.13	5.12	5.00	4.72	4.69	4.60	4.63	4.80	4.85	4.91	4.96	5.66	5.73	5.81	5.76	5.78	5.60	5.53		
180	5.27	5.34	5.37	5.35	5.24	5.21	5.25	5.05	5.15	5.22	5.15	5.25	5.26	5.34	5.38	5.35	5.25	5.23	5.26		

Table--2 UNIT: cd

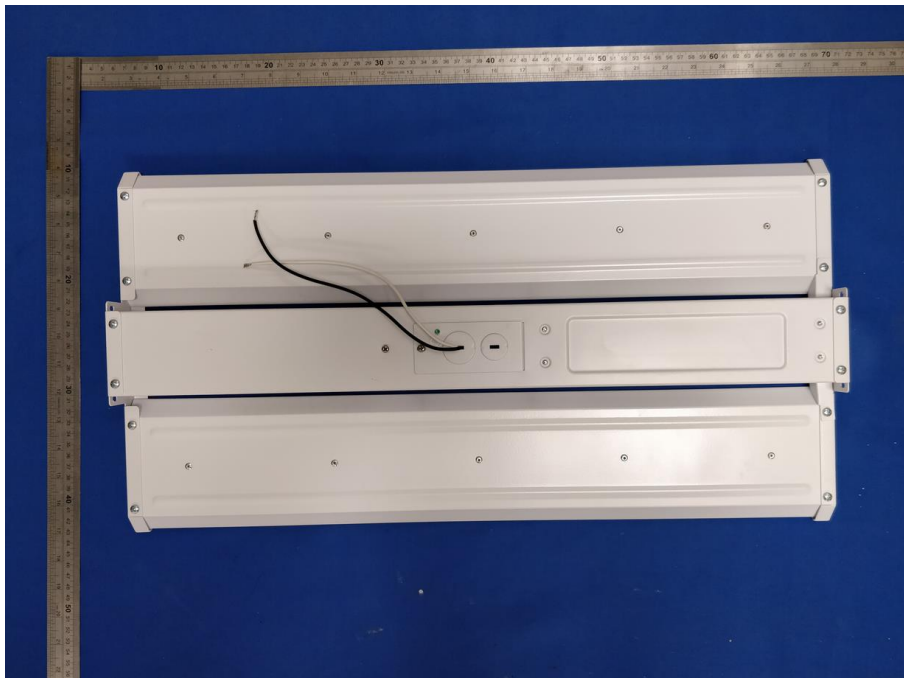
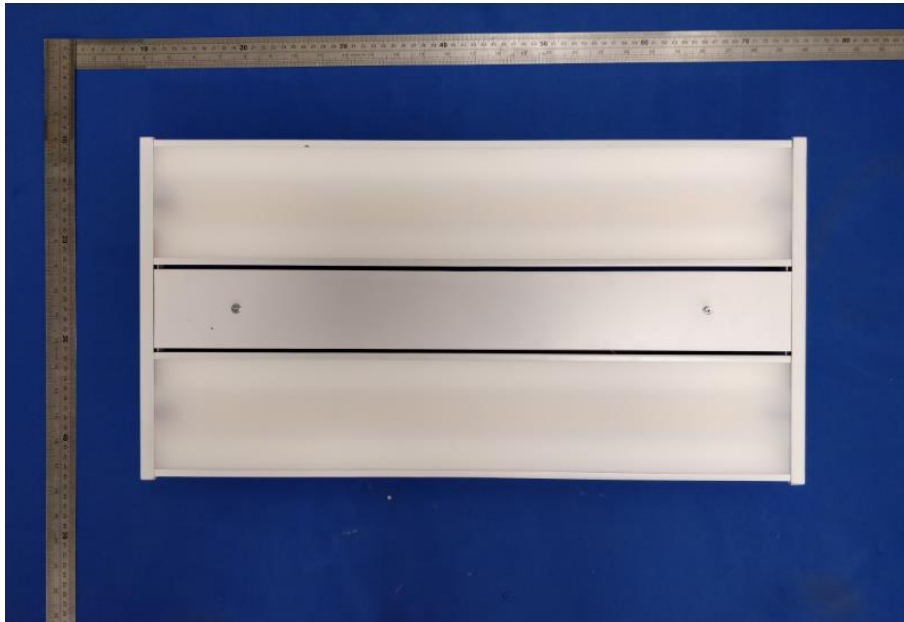
C (DEG)						
γ (DEG)	285	300	315	330	345	
0	7152	7152	7152	7152	7152	
5	7113	7095	7113	7099	7132	
10	6978	6988	7002	6974	7026	
15	6796	6773	6796	6798	6819	
20	6507	6502	6509	6521	6549	
25	6136	6161	6189	6171	6209	
30	5738	5719	5754	5760	5796	
35	5268	5271	5319	5307	5338	
40	4768	4775	4796	4810	4853	
45	4228	4242	4259	4290	4313	
50	3689	3696	3716	3745	3775	
55	3141	3141	3171	3195	3220	
60	2594	2605	2633	2652	2674	
65	2071	2085	2101	2124	2147	
70	1574	1595	1594	1621	1624	
75	1105	1121	1128	1142	1141	
80	668	686	684	691	682	
85	260	266	261	271	261	
90	1.03	1.01	1.24	0.99	28.7	
95	1.35	1.33	1.34	1.41	1.40	
100	1.74	1.69	1.73	1.69	1.69	
105	2.03	1.97	1.96	1.88	2.23	
110	2.09	2.03	2.01	1.94	2.23	
115	2.13	2.07	2.05	2.12	2.30	
120	2.27	2.22	2.25	2.97	2.52	
125	2.69	2.57	3.02	3.14	2.67	
130	3.26	3.36	4.05	3.63	3.15	
135	4.60	4.80	4.35	4.06	3.76	
140	5.25	5.04	4.82	4.46	4.21	
145	5.51	5.47	5.25	4.55	4.71	
150	5.95	5.73	5.68	5.23	5.14	
155	6.17	6.01	5.62	5.92	5.54	
160	5.86	5.82	6.09	6.04	5.88	
165	6.15	6.06	6.08	5.97	5.80	
170	6.11	5.80	5.91	5.83	5.66	
175	5.64	5.43	5.69	5.65	5.67	
180	5.07	5.15	5.22	5.15	5.26	

**THD and PF Measurement Test Results:**

**Electrical Measurement:**

Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor	iTHD(%)
277.0	60	0.5187	137.1	0.9542	11.74

**Photo of Sample:**





**Equipment List:**

Equipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2018-11-16	2019-11-15
NTC-F01-006	2.0 meter Integrating Sphere	2018-11-16	2019-11-15
NTC-F01-012	Standard Lamp	2018-11-13	2019-11-12
NTC-F01-013	Standard Lamp	2018-11-13	2019-11-12
NTC-F01-031	Digital Power Meter	2018-08-29	2019-08-28
NTC-F01-019	Temperature & Humidity Meter	2018-11-12	2019-11-11

\*\*\*\*\*End of Report\*\*\*\*\*