

## 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 519085

### LED Ceiling Light

Model Name(s):

565491##

Representative (Tested) Model:

56549101

**Model Difference: Where “##” denotes color temperature, 01-10 identifies CCT tunable to 3000K, 4000K and 5000K.**

Prepare by:

*Derek Lai*

Engineer: Derek Lai

Date: 2019-05-05

Review by:

*Vincent Yuan*

Technical Lead: Vincent Yuan

Issue Date: 2019-05-14

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, Commercial Electric
Model Number:	565491## (##=01-10)
Product Type:	Indoor, LED Light Engine
Rating Input:	120Vac, 60Hz, 22W
Declared CCT:	3000K, 4000K, 5000K
Declared Light Output:	1400 lm
LED Manufacturer:	Samsung
LED Model:	SPMWHX228FXXXXXXXXX for Nightlight SPMWHX229AXXXXXXXXX for Ceiling Light
LED Quantity:	51 pcs for Nightlight 72 pcs for Ceiling Light

**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:	2019-04-27
Quantity of Receipt Samples:	1 pcs
Sample Number:	190427002-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:	2019-05-14
Revised Date of Test Report:	N/A
Test Report No.:	NTCR19050002
Remark (If applicable):	All test tested for 3000K.

<b>Test Specification:</b>	
Date of Test	2019-04-30
Test Item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate
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 <math>25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}</math>, 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 <math>1^{\circ}</math> vertical intervals and <math>15^{\circ}</math> 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 <math>25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}</math>. 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>

**Integrating Sphere Test Results:**

**Test Condition:**

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
24.8	49.0	Face Down	90	10

**Electrical Data:**

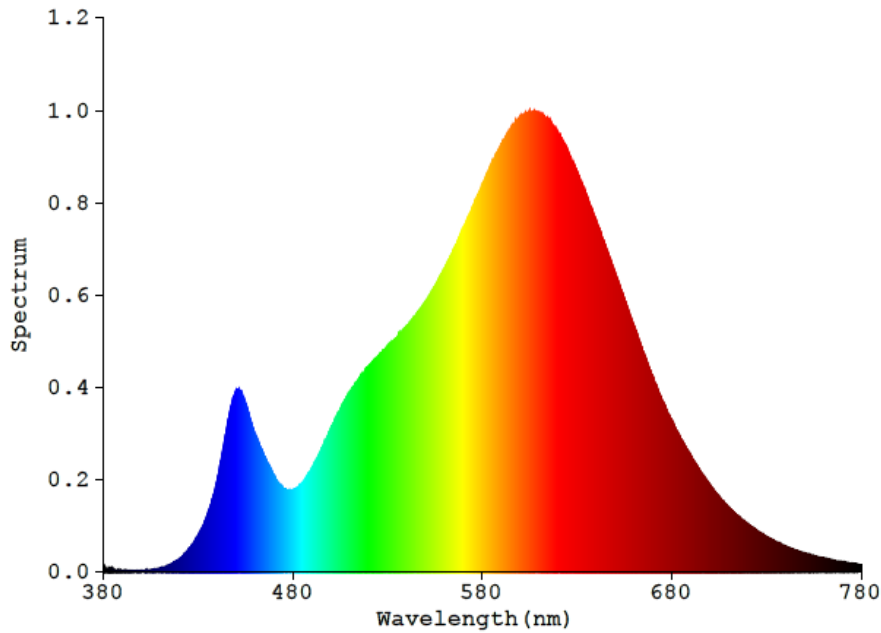
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.1791	20.83	0.9688

**Color Data:**

Parameter	Result
CCT(K)	2872
Color Rendering Index (CRI)	84.5
R9	16
Chromaticity, x	0.4480
Chromaticity, y	0.4102
Chromaticity, u'	0.2550
Chromaticity, v'	0.5254
Duv	0.00102

Special Color Rendering			
R1	83	R9	16
R2	92	R10	81
R3	97	R11	83
R4	83	R12	75
R5	83	R13	85
R6	91	R14	99
R7	84	R15	76
R8	62	-	-

**Spectrum Diagram:**



**Goniophotometer Test Results:**

**Test Condition:**

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
24.8	49.0	Face Down	90	25

**Electrical Data:**

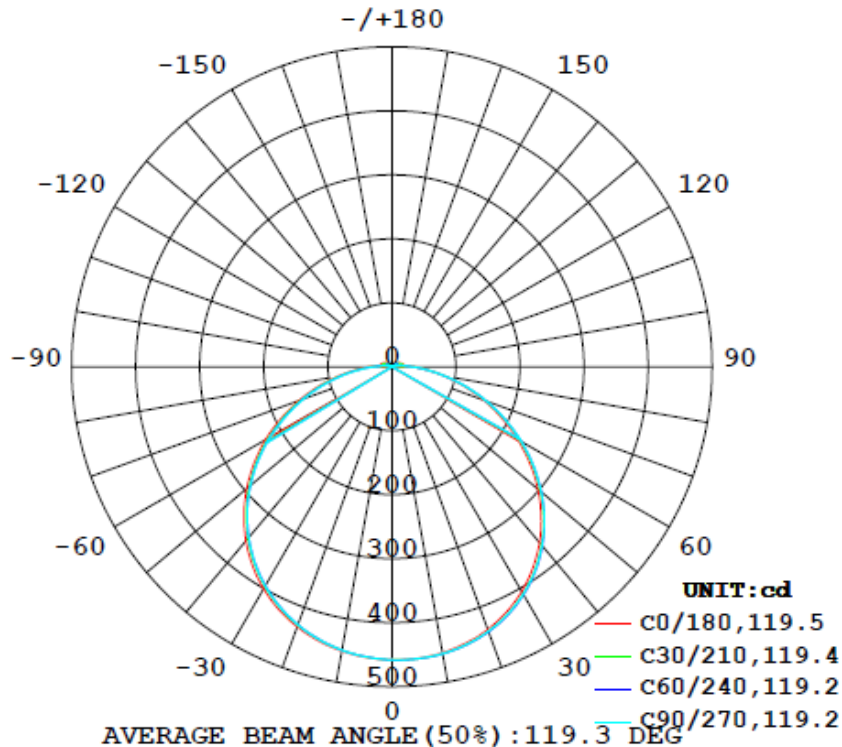
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.1791	20.83	0.9688

**Goniophotometer Data:**

Parameter	Results
Total Luminous (lm)	1518.4
Luminous Efficacy (lm/w)	72.89
Zonal Lumens Distribution (0-60°)	71.8%
Beam Angle (°)	119.3

**Luminous Intensity Distribution Diagram:**

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM

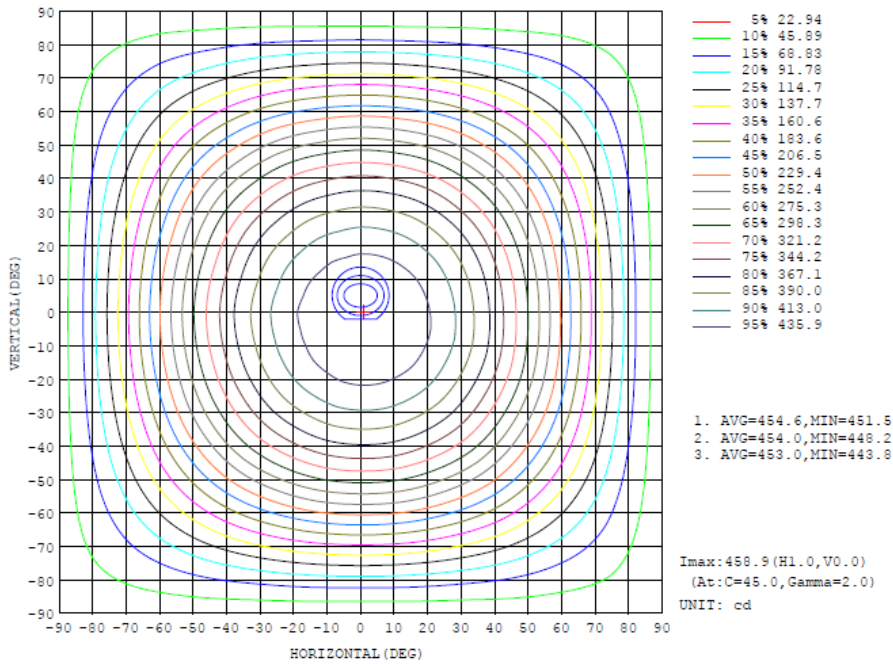


**Zonal Flux Diagram:**

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	Φlum, lamp
10	452.9	455.8	455.0	452.0	451.1	449.0	449.5	451.3	0- 10	43.45	42.45	2.86,2.86
20	437.0	441.1	439.8	436.4	432.4	428.5	429.2	432.8	10- 20	125.7	169.2	11.1,11.1
30	405.4	411.4	410.2	405.7	400.7	395.0	395.8	400.0	20- 30	194.0	363.2	23.9,23.9
40	358.5	365.6	364.7	360.2	354.9	347.9	348.1	352.7	30- 40	238.8	601.9	39.6,39.6
50	297.4	305.2	304.4	300.8	296.1	288.4	288.5	292.0	40- 50	252.1	855.0	56.3,56.3
60	226.5	234.0	233.1	231.0	228.0	220.2	219.8	222.3	50- 60	234.7	1090	71.8,71.8
70	151.9	157.3	157.1	156.1	155.0	148.2	146.4	149.0	60- 70	187.8	1277	84.1,84.1
80	81.91	85.20	84.15	85.05	86.02	79.59	77.49	79.24	70- 80	123.2	1401	92.2,92.2
90	22.76	32.93	30.72	32.64	35.42	30.81	27.76	29.55	80- 90	59.11	1460	96.1,96.1
100	19.17	6.049	15.35	6.432	19.00	6.920	14.92	6.741	90-100	19.42	1479	97.4,97.4
110	16.42	12.23	0.2516	11.48	16.59	10.99	0.4674	11.01	100-110	11.17	1490	98.2,98.2
120	12.82	11.05	6.935	10.96	12.15	10.45	4.590	10.50	110-120	9.464	1500	98.8,98.8
130	7.640	8.728	8.038	8.616	3.477	8.227	7.422	8.291	120-130	8.211	1508	99.3,99.3
140	5.611	6.461	6.142	6.432	5.677	6.002	5.704	6.162	130-140	5.456	1514	99.7,99.7
150	1.070	3.497	4.321	3.525	1.168	3.381	3.973	3.328	140-150	2.942	1516	99.9,99.9
160	1.694	2.106	2.469	2.442	1.878	2.505	2.362	2.100	150-160	1.397	1518	100,100
170	0.5578	0.7208	1.262	1.597	0.5659	1.505	1.225	0.8073	160-170	0.5182	1518	100,100
180	0.2955	0.3052	0.2917	0.2870	0.2948	0.3052	0.2911	0.2864	170-180	0.0772	1518	100,100
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 15.1 %									UNIT:lm		

**Isocandela Diagram:**



**Luminous Distribution Intensity Data:**

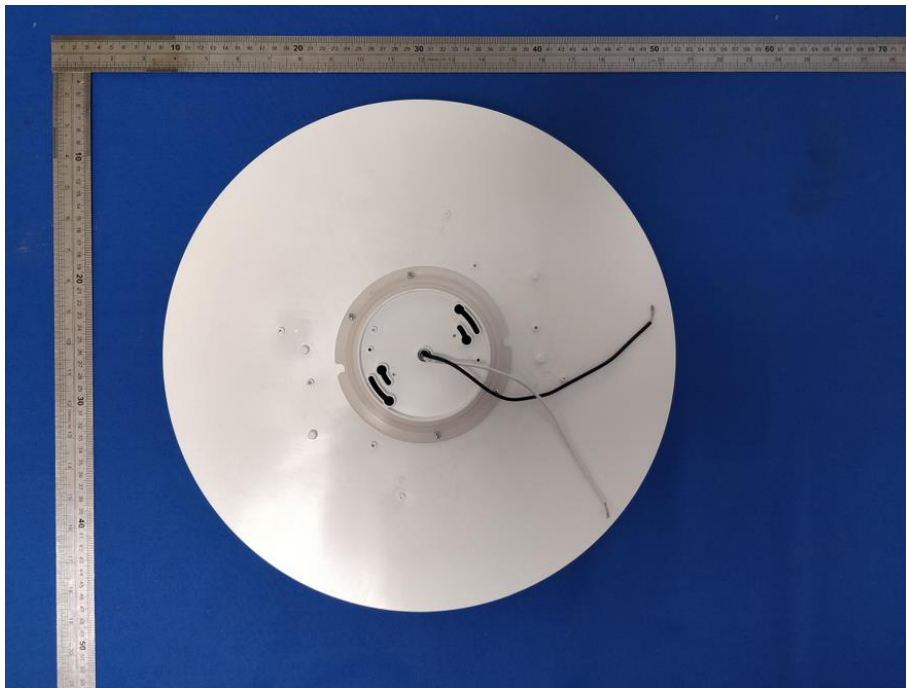
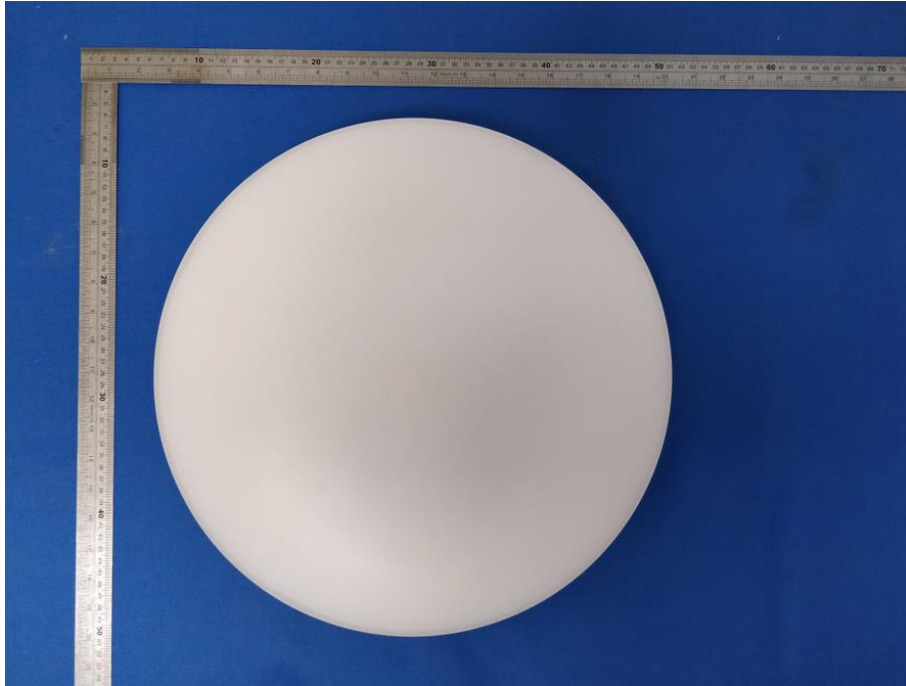
Table--1 UNIT: cd

C (DEG) y (DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
0	458	458	458	458	458	458	458	458	458	458	458	458	458	458	458	458	458	458	458
5	457	458	458	458	458	458	458	458	457	457	457	456	456	455	455	455	455	455	455
10	454	455	455	456	456	456	455	454	453	452	452	451	450	450	449	449	449	449	450
15	447	449	449	450	450	450	449	448	448	446	445	444	443	441	441	440	441	440	441
20	437	439	440	441	441	441	440	439	437	436	434	433	432	430	430	429	429	428	429
25	423	426	427	428	428	428	427	426	424	423	421	419	418	415	415	413	414	413	414
30	405	409	410	411	411	411	410	409	407	406	403	402	401	398	397	395	395	394	396
35	384	388	389	390	390	391	390	389	386	385	382	381	380	376	375	373	373	372	374
40	358	363	364	366	365	366	365	364	362	360	357	356	355	351	350	348	348	347	348
45	329	334	335	337	337	337	336	336	334	332	329	328	327	322	322	320	320	318	320
50	297	303	303	305	305	306	304	304	302	301	298	297	296	291	291	288	288	287	289
55	263	268	268	271	270	271	270	270	268	267	264	263	263	258	258	255	255	254	255
60	226	231	232	234	233	234	233	233	232	231	229	228	228	223	223	220	220	219	220
65	189	193	194	195	195	196	195	195	194	193	192	191	191	187	186	184	184	182	183
70	152	156	156	157	157	157	157	156	156	155	154	155	151	150	148	147	146	146	146
75	116	119	119	120	120	120	120	120	119	119	118	119	116	115	113	112	111	111	111
80	81.9	84.9	84.6	85.2	84.3	84.5	84.2	84.6	84.5	85.1	84.9	84.9	86.0	82.6	82.0	79.6	79.1	77.2	77.5
85	53.0	55.6	54.7	55.0	53.6	53.7	53.1	53.7	53.8	54.9	55.0	55.7	56.8	53.9	53.5	51.2	50.5	48.6	48.5
90	32.8	34.3	33.4	32.9	31.6	31.4	30.7	31.2	31.4	32.6	33.3	34.4	35.4	33.5	32.8	30.8	29.7	28.1	27.8
95	3.13	0.76	1.1	0.76	20.9	20.5	20.1	20.4	20.6	18.7	9.25	3.09	9.62	6.01	13.4	19.8	19.6	18.6	18.7
100	19.2	16.7	13.5	6.05	10.1	14.7	15.3	14.6	10.4	6.43	11.8	16.4	19.0	16.1	10.3	6.92	11.5	14.0	14.9
105	18.0	15.5	17.0	9.74	3.71	4.12	5.03	4.36	3.69	8.62	15.8	15.2	18.0	15.0	15.3	7.87	4.43	5.83	6.86
110	16.4	13.9	14.9	12.2	7.26	3.16	0.35	3.19	6.58	11.5	14.6	13.7	16.6	13.5	14.4	11.0	5.97	2.77	0.47
115	14.6	12.2	13.4	12.1	7.98	4.27	2.68	4.32	7.47	12.0	13.1	12.1	14.9	12.0	12.8	11.1	6.86	3.65	1.65
120	12.8	10.7	12.0	11.1	10.4	8.37	6.94	8.19	10.3	11.0	11.7	10.6	13.2	10.5	11.5	10.5	8.85	5.80	4.59
125	11.0	9.39	10.6	9.93	9.35	9.26	9.02	9.39	9.35	9.82	10.5	9.11	11.3	9.11	10.2	9.34	8.75	8.52	7.87
130	7.64	8.06	9.04	8.73	8.27	8.26	8.04	8.32	8.25	8.62	9.10	7.87	3.48	7.65	8.85	8.23	7.74	7.62	7.42
135	6.99	6.93	7.16	7.59	7.53	7.21	7.05	7.26	7.26	7.49	7.28	6.71	7.12	6.58	7.05	7.14	6.85	6.62	6.43
140	5.61	5.54	5.49	6.46	6.29	6.23	6.14	6.30	6.28	6.43	5.52	5.58	5.68	5.40	5.37	6.00	5.72	6.11	5.70
145	4.51	4.75	4.38	5.12	5.36	5.47	5.23	5.36	5.32	5.36	3.85	4.39	4.37	4.32	3.62	4.83	5.03	5.01	4.88
150	1.07	1.91	3.87	3.50	4.36	4.54	4.33	4.61	4.36	3.53	3.57	1.63	1.17	1.65	3.58	3.38	4.19	4.31	3.97
155	2.55	3.35	3.13	2.88	2.74	2.93	3.13	3.01	2.75	3.15	2.84	3.33	2.73	3.28	2.84	3.10	2.64	2.82	3.00
160	1.69	2.25	2.27	2.11	2.45	2.38	2.47	2.57	2.61	2.44	2.49	2.29	1.88	2.26	2.57	2.50	2.61	2.51	2.36
165	1.06	1.57	1.99	1.44	1.69	1.73	2.13	2.06	1.94	1.89	1.98	1.74	1.07	1.77	1.90	1.95	2.19	2.09	2.12
170	0.56	0.68	0.54	0.72	1.55	1.25	1.26	1.58	1.58	1.54	1.52	0.82	0.57	0.98	1.35	1.50	1.65	1.62	1.32
175	0.28	0.39	0.51	0.70	0.89	0.94	0.86	0.84	0.77	0.60	0.50	0.34	0.33	0.44	0.58	0.71	0.79	0.78	0.75
180	0.30	0.30	0.31	0.31	0.29	0.29	0.29	0.27	0.28	0.29	0.29	0.29	0.29	0.30	0.31	0.31	0.30	0.29	0.29

Table--2 UNIT: cd

C (DEG) y (DEG)	285	300	315	330	345														
0	458	458	458	458	458														
5	455	456	456	457	457														
10	450	451	451	453	453														
15	442	443	444	445	446														
20	430	431	433	435	436														
25	415	417	418	420	422														
30	396	399	400	402	405														
35	374	377	378	381	383														
40	349	351	353	356	358														
45	320	323	324	327	329														
50	289	291	292	295	297														
55	255	257	258	261	263														
60	219	222	222	225	227														
65	183	184	186	188	190														
70	146	148	149	151	153														
75	111	112	113	115	116														
80	77.0	78.4	79.2	81.4	82.6														
85	48.1	49.4	50.3	52.5	53.4														
90	27.5	28.5	29.6	31.5	32.8														
95	18.3	18.8	16.0	5.98	7.58														
100	13.3	9.91	6.74	12.6	16.5														
105	5.35	4.44	8.83	15.6	15.3														
110	2.77	6.23	11.0	14.4	13.7														
115	3.33	6.49	11.2	12.9	12.1														
120	5.91	8.94	10.5	11.6	10.6														
125	8.55	8.78	9.41	10.3	9.13														
130	7.62	7.75	8.29	8.86	8.06														
135	6.68	6.85	7.21	7.04	6.86														
140	5.79	5.93	6.16	5.37	5.56														
145	4.71	5.06	5.03	4.28	4.64														
150	4.26	4.16	3.33	4.02	1.96														
155	2.76	2.58	2.82	3.28	3.42														
160	2.22	2.27	2.10	2.36	2.28														
165	1.68	1.59	1.49	2.12	1.65														
170	1.30	1.41	0.81	0.70	0.80														
175	1.01	0.97	0.75	0.64	0.43														
180	0.27	0.28	0.29	0.29	0.29														

**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\*\*\*\*\*