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

Security Lighting

Model Name(s):
514051##

Representative (Tested) Model:
51405141

Model Difference:

1. **Product is Field-adjustable product, Wattage can adjust 14W and 28W.**
2. **Where ## denotes color temperature 41~50 identifies 4000K.**

Prepare by:

Derek Lai

Engineer: Derek Lai
Date: 2019-09-24

Review by:

Vincent Yuan

Technical Lead: Vincent Yuan
Issue Date: 2019-10-18
Revised Date: N/A

Note:
1. The results contained in this report pertain only to the tested samples.
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3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency of the Federal Government.

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Tel: 86-769-22212079
Website: http://www.ntc-cert.com

Product Information:

Client Name:	ETI Solid State Lighting (Zhuhai) Ltd
Brand Name:	Commercial Electric
Model Number:	514051##(##=41-50)
Product Type:	Outdoor, Security Luminaires
Rating Input:	120Vac, 60Hz, 14W/28W
Declared CCT:	4000 K
Declared Light Output:	2400 lm
LED Manufacturer:	Samsung Electronics Co., LTD.
LED Model:	SPMWHX228FD5WAW0XX
LED Quantity:	60 pcs

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:	2019-09-14
Quantity of Receipt Samples:	1 pcs
Sample Number:	190914003-S1

Laboratory Information:

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

Report Information:

Issued Date of Test Report:	2019-10-18
Revised Date of Test Report:	N/A
Test Report No.:	NTCLR19090164
Remark *(If applicable)*:	1. Product tested with the default maximum wattage, the default maximum wattage is 28W.

Test Specification:	
Date of Test	2019-09-18
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

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 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° horizonal intervals.

2. Photometric and Electrical Measurements – Integrating Sphere Method:

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.

Integrating Sphere Test Results:

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
24.9	41.0	Face Down	90	10

Electrical Data:

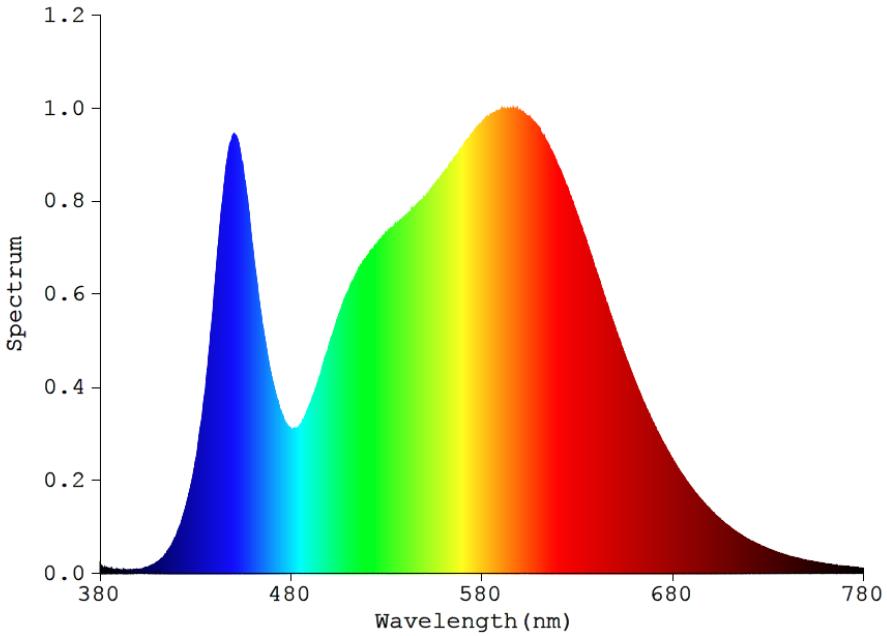
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.2305	26.98	0.9775

Color Data:

Parameter	Result
CCT(K)	4048
Ra	84.0
R9	13
Chromaticity, x	0.3783
Chromaticity, y	0.3754
Chromaticity, u'	0.2242
Chromaticity, v'	0.5007
Duv	0.00003

Special Color Rendering			
R1	83	R9	17
R2	90	R10	75
R3	95	R11	83
R4	83	R12	66
R5	83	R13	84
R6	86	R14	97
R7	87	R15	77
R8	67	-	-

Spectrum Diagram:



Goniophotometer Test Results:

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
24.9	41.0	Face Down	90	25

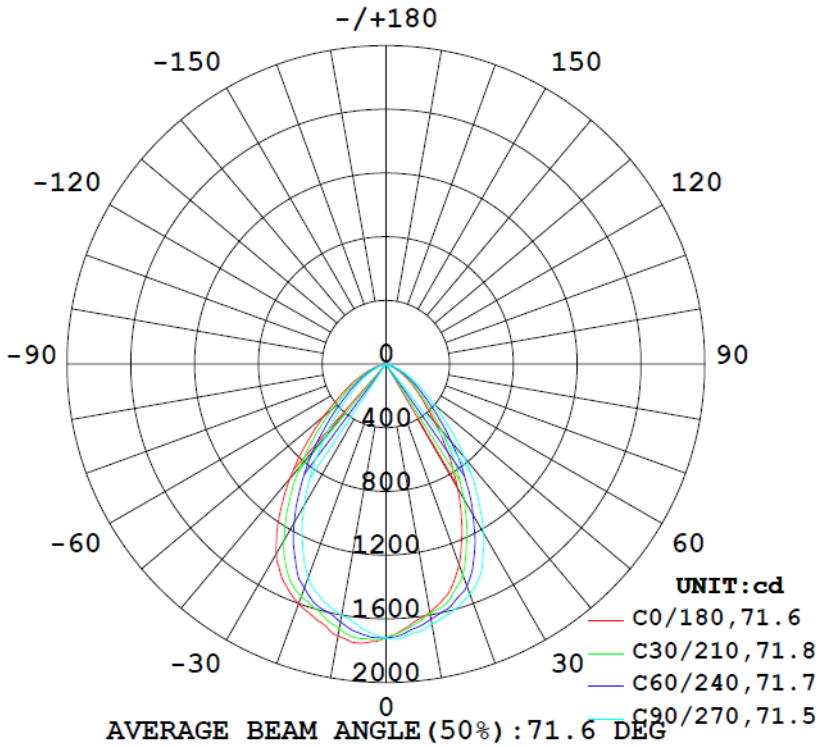
Electrical Data:

Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.2305	26.98	0.9775

Goniophotometer Data:

Parameter	Results
Total Luminous (lm)	2543.7
Luminous Efficacy (lm/w)	94.28
Zonal Lumens Distribution (0-85°)	100%
Zonal Lumens Distribution (90-180°)	0.1%
Beam Angle (°)	71.6

Luminous Intensity Distribution Diagram:

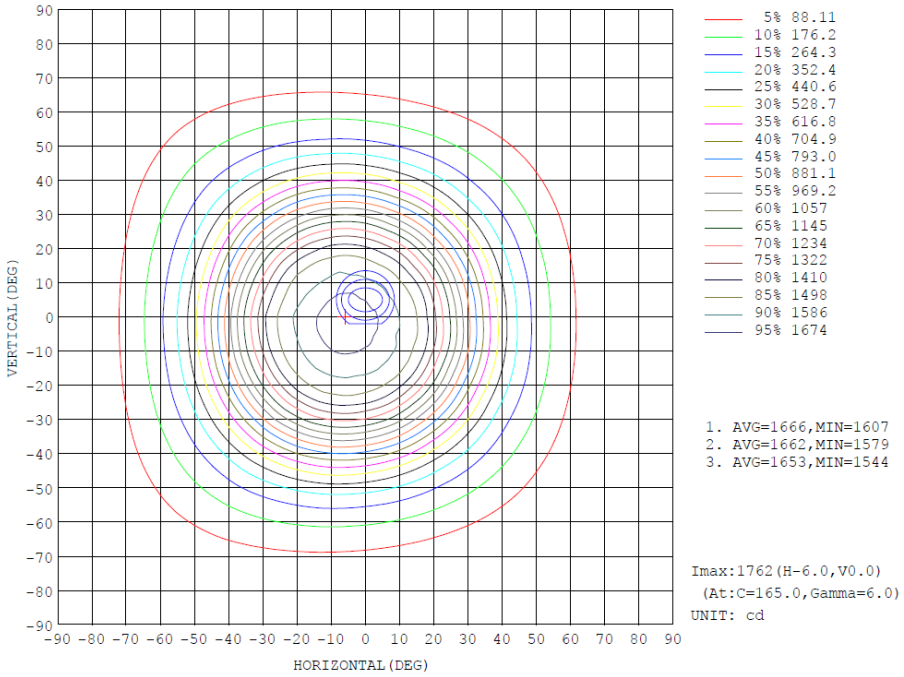


Zonal Flux Diagram:

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	1582	1610	1657	1721	1734	1670	1602	1578	0- 10	160.3	160.3	6.3,6.3
20	1342	1443	1536	1598	1602	1525	1426	1335	10- 20	442.4	602.7	23.7,23.7
30	898.2	1038	1224	1373	1378	1219	1030	897.9	20- 30	605.8	1209	47.5,47.5
40	482.1	593.9	768.6	932.9	939.4	767.6	594.2	488.3	30- 40	567.5	1776	69.8,69.8
50	238.0	292.2	391.6	498.9	509.4	395.4	294.3	241.4	40- 50	393.4	2169	85.3,85.3
60	104.2	135.4	189.3	242.0	249.5	196.5	143.3	108.3	50- 60	226.7	2396	94.2,94.2
70	23.24	39.68	70.48	103.7	109.7	79.92	46.86	26.56	60- 70	110.5	2507	98.5,98.5
80	0.1836	0.6905	8.968	23.51	26.61	13.12	1.947	0.2158	70- 80	32.71	2539	99.8,99.8
90	0	0	0	0.1134	0.1856	0.0263	0	0	80- 90	2.580	2542	99.9,99.9
100	0	0	0	0	0	0	0.0002	0.0327	90-100	0.0062	2542	99.9,99.9
110	0	0	0	0	0	0.0158	0.0619	0.1065	100-110	0.0179	2542	99.9,99.9
120	0.0810	0.0490	0.0167	0.0000	0.0641	0.1024	0.1675	0.2215	110-120	0.0498	2542	99.9,99.9
130	0.2240	0.1880	0.1434	0.1036	0.2605	0.3331	0.4390	0.4789	120-130	0.1554	2542	99.9,99.9
140	0.4051	0.3807	0.3323	0.2739	0.5103	0.6445	0.7657	0.7865	130-140	0.3034	2543	100,100
150	0.5601	0.5708	0.5179	0.4476	0.7891	0.9428	1.066	1.054	140-150	0.3948	2543	100,100
160	0.7186	0.7250	0.6524	0.6294	1.091	1.189	1.232	1.243	150-160	0.3898	2543	100,100
170	0.8061	0.8361	0.7659	0.7294	1.182	1.228	1.198	1.167	160-170	0.2766	2544	100,100
180	1.047	1.056	0.9946	0.9479	1.047	1.057	0.9999	0.9526	170-180	0.0932	2544	100,100
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 7.9 %									UNIT:lm		

Isocandela Diagram:



Luminous Distribution Intensity Data:

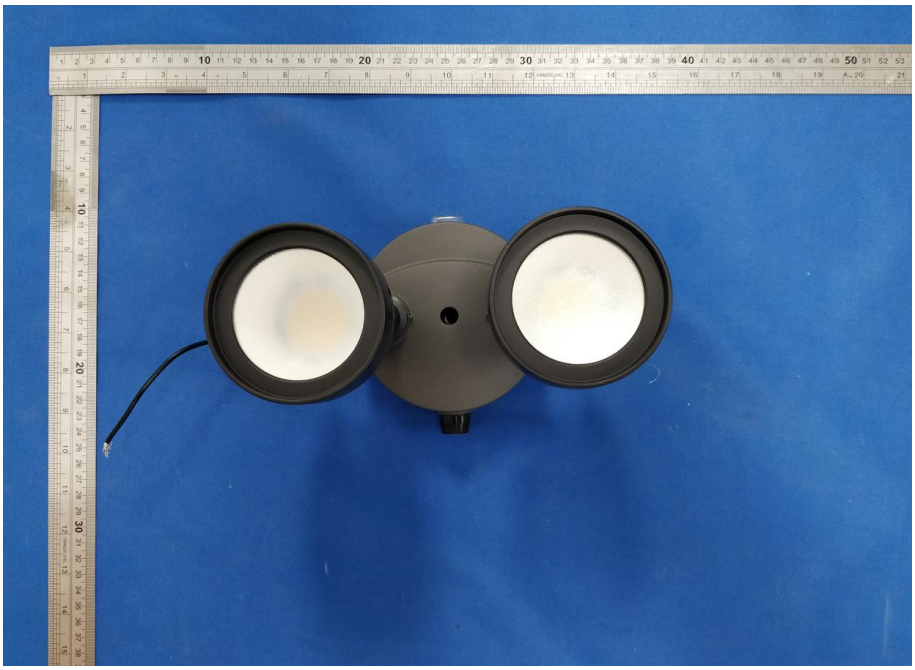
Table--1 UNIT: cd

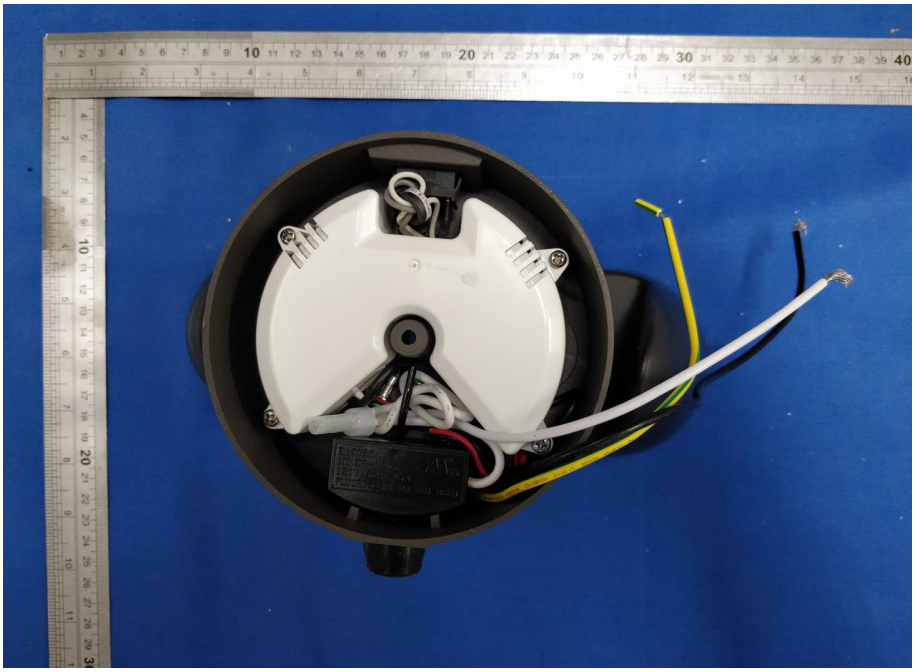
γ (DEG) \ C (DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
0	1718	1718	1718	1718	1718	1718	1718	1718	1718	1718	1718	1718	1718	1718	1718	1718	1718	1718	1718
5	1651	1655	1660	1672	1680	1687	1705	1723	1731	1749	1753	1759	1759	1743	1730	1716	1703	1680	1671
10	1582	1587	1589	1610	1628	1658	1657	1684	1699	1721	1732	1739	1734	1699	1687	1670	1645	1624	1602
15	1498	1508	1537	1556	1573	1591	1608	1619	1640	1655	1661	1672	1665	1632	1611	1594	1587	1556	1536
20	1342	1371	1409	1443	1485	1511	1536	1566	1584	1598	1600	1597	1602	1565	1553	1525	1496	1465	1426
25	1130	1172	1202	1259	1312	1373	1422	1464	1501	1516	1525	1519	1513	1472	1455	1402	1347	1299	1240
30	898	945	980	1038	1092	1164	1224	1287	1337	1373	1387	1387	1378	1323	1280	1219	1151	1089	1030
35	677	719	752	807	862	936	1000	1065	1122	1162	1178	1185	1169	1110	1061	996	930	863	804
40	482	517	544	594	642	711	769	836	887	933	943	958	939	884	837	768	712	647	594
45	335	360	379	417	457	508	558	617	660	701	717	727	709	663	621	565	512	461	419
50	238	254	267	292	318	355	392	433	470	499	515	521	509	471	440	395	359	321	294
55	164	175	186	203	223	250	274	304	326	348	356	360	355	328	308	278	254	229	210
60	104	112	121	135	151	170	189	210	226	242	249	254	250	231	218	196	179	160	143
65	56.5	63.0	69.0	80.6	92.9	108	123	139	153	165	171	174	171	159	148	133	118	102	88.9
70	23.2	27.7	31.7	39.7	48.0	59.3	70.5	83.3	93.6	104	109	111	110	100	91.9	79.9	68.4	56.4	46.9
75	3.75	5.86	8.66	12.7	17.6	25.6	32.4	41.4	49.0	56.4	60.2	62.4	61.3	54.2	48.6	39.7	32.1	23.9	18.3
80	0.18	0.21	0.27	0.69	2.05	4.57	8.97	13.6	18.1	23.5	25.5	27.0	26.6	22.1	19.2	13.1	8.83	5.20	1.95
85	0.00	0.00	0.00	0.01	0.07	0.16	0.25	0.46	1.39	2.92	4.68	5.04	5.01	2.96	1.93	0.63	0.28	0.17	0.10
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.17	0.18	0.19	0.15	0.10	0.03	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.03
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.05	0.06
115	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.05	0.06	0.08	0.10
120	0.08	0.07	0.06	0.05	0.04	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.06	0.07	0.08	0.10	0.12	0.14	0.17
125	0.15	0.14	0.12	0.11	0.10	0.08	0.07	0.06	0.05	0.04	0.04	0.04	0.15	0.16	0.17	0.20	0.22	0.25	0.28
130	0.22	0.22	0.20	0.19	0.18	0.15	0.14	0.12	0.11	0.10	0.10	0.09	0.26	0.28	0.30	0.33	0.37	0.41	0.44
135	0.31	0.31	0.30	0.28	0.28	0.24	0.23	0.21	0.20	0.18	0.19	0.18	0.39	0.42	0.44	0.49	0.52	0.57	0.61
140	0.41	0.40	0.40	0.38	0.37	0.34	0.33	0.31	0.28	0.27	0.26	0.26	0.51	0.54	0.58	0.64	0.69	0.74	0.77
145	0.49	0.50	0.49	0.48	0.47	0.46	0.42	0.41	0.38	0.36	0.33	0.35	0.64	0.69	0.72	0.80	0.85	0.90	0.93
150	0.56	0.58	0.58	0.57	0.57	0.55	0.52	0.50	0.47	0.45	0.41	0.41	0.79	0.82	0.86	0.94	1.00	1.06	1.07
155	0.63	0.67	0.68	0.65	0.64	0.62	0.59	0.58	0.56	0.53	0.52	0.48	0.92	0.93	1.02	1.07	1.12	1.17	1.18
160	0.72	0.76	0.76	0.73	0.70	0.69	0.65	0.66	0.64	0.63	0.63	0.60	1.09	1.10	1.14	1.19	1.22	1.24	1.23
165	0.76	0.80	0.81	0.79	0.76	0.73	0.71	0.73	0.71	0.71	0.70	0.68	1.15	1.16	1.20	1.24	1.26	1.25	1.25
170	0.81	0.84	0.85	0.84	0.80	0.76	0.77	0.76	0.75	0.73	0.73	0.74	1.18	1.20	1.22	1.23	1.22	1.19	1.20
175	0.89	0.92	0.94	0.92	0.89	0.86	0.83	0.83	0.82	0.81	0.81	0.83	1.11	1.14	1.14	1.13	1.12	1.10	1.07
180	1.05	1.07	1.06	1.06	1.02	1.00	0.99	0.93	0.94	0.95	0.96	1.00	1.05	1.07	1.06	1.06	1.03	1.00	1.00

Table--2 UNIT: cd

γ (DEG) \ C (DEG)	285	300	315	330	345
0	1718	1718	1718	1718	1718
5	1662	1649	1649	1658	1653
10	1594	1587	1578	1579	1579
15	1516	1504	1493	1489	1495
20	1388	1363	1335	1336	1335
25	1189	1162	1126	1125	1121
30	973	932	898	891	893
35	746	714	681	673	667
40	545	514	488	480	477
45	384	361	341	336	332
50	270	254	241	237	235
55	190	178	168	163	162
60	128	117	108	104	103
65	76.8	67.7	60.7	57.7	55.9
70	37.8	31.7	26.6	24.9	22.9
75	11.9	8.44	6.03	4.17	3.55
80	0.48	0.24	0.22	0.21	0.20
85	0.02	0.00	0.00	0.00	0.00
90	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00
100	0.01	0.02	0.03	0.04	0.04
105	0.05	0.06	0.08	0.08	0.08
110	0.08	0.09	0.11	0.11	0.11
115	0.12	0.13	0.15	0.15	0.15
120	0.19	0.21	0.22	0.23	0.23
125	0.31	0.32	0.34	0.34	0.35
130	0.46	0.48	0.48	0.48	0.48
135	0.64	0.64	0.63	0.63	0.63
140	0.79	0.77	0.79	0.76	0.75
145	0.93	0.94	0.92	0.89	0.88
150	1.07	1.06	1.05	1.01	1.01
155	1.19	1.19	1.16	1.17	1.12
160	1.25	1.25	1.24	1.25	1.23
165	1.24	1.26	1.25	1.23	1.25
170	1.19	1.16	1.17	1.18	1.19
175	1.08	1.05	1.06	1.09	1.11
180	0.94	0.94	0.95	0.97	1.00

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	2019-08-22	2020-08-21
NTC-F01-019	Temperature & Humidity Meter	2018-11-12	2019-11-11

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

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