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

LED Ceiling Light

Model Name(s):
565581##

Representative (Tested) Model:
56558101

Model Difference: Where "##" denotes color tunable, 01-10 identifies CCT tunable to 2700K, 3000K, 3500K, 4000K and 5000K.

Prepare by:

Derek Lai

Engineer: Derek Lai
Date: 2019-04-16

Review by:

Vincent Yuan

Technical Lead: Vincent Yuan
Issue Date: 2019-05-05
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.

Laboratory: Dongguan New Testing Centre Co., Ltd
Address: 3F, No. 1 the 1st North Industry Road, Songshan Lake Science & Technology Park, Dongguan, Guangdong, China
Tel: 86-769-22212079
Website: http://www.ntc-cert.com

Product Information:

Client Name:	ETI Solid State Lighting (Zhuhai) Ltd
Brand Name:	ETI
Model Number:	565581##(##=01-10)
Product Type:	Indoor, Inseparable SSL Luminaire
Rating Input:	120Vac, 60Hz, 11.5W
Declared CCT:	2700K, 3000K, 3500K, 4000K, 5000K
Declared Light Output:	810 lm
LED Manufacturer:	Samsung
LED Model:	SPMWHX228FD5WAXXXX
LED Quantity:	90 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:	2019-04-02
Quantity of Receipt Samples:	1 pcs
Sample Number:	190402001-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:	2019-05-05
Revised Date of Test Report:	N/A
Test Report No.:	NTCR19040068
Remark *(If applicable)*:	N/A

Test Specification:	
Date of Test	2019-04-10
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)
24.2	47.3	Face Down	90	10

Electrical Data:

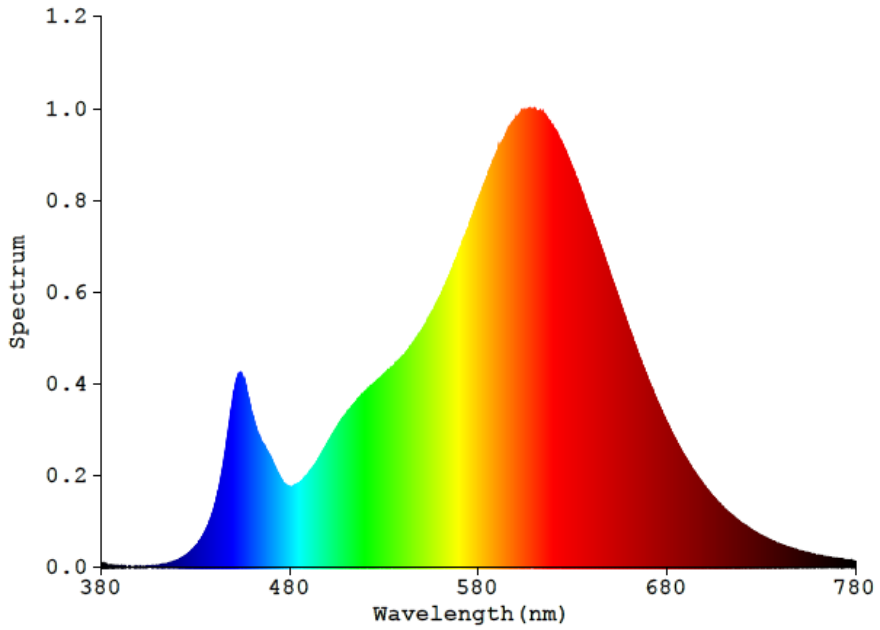
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.1104	11.30	0.8531

Color Data:

Parameter	Result
CCT(K)	2691
Ra	83.8
R9	14
Chromaticity, x	0.4566
Chromaticity, y	0.4036
Chromaticity, u'	0.2635
Chromaticity, v'	0.5242
Duv	-0.00234

Special Color Rendering			
R1	83	R9	14
R2	94	R10	87
R3	93	R11	82
R4	81	R12	80
R5	84	R13	86
R6	94	R14	97
R7	81	R15	76
R8	59	-	-

Spectrum Diagram:



Goniophotometer Test Results:

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
24.2	47.3	Face Down	90	25

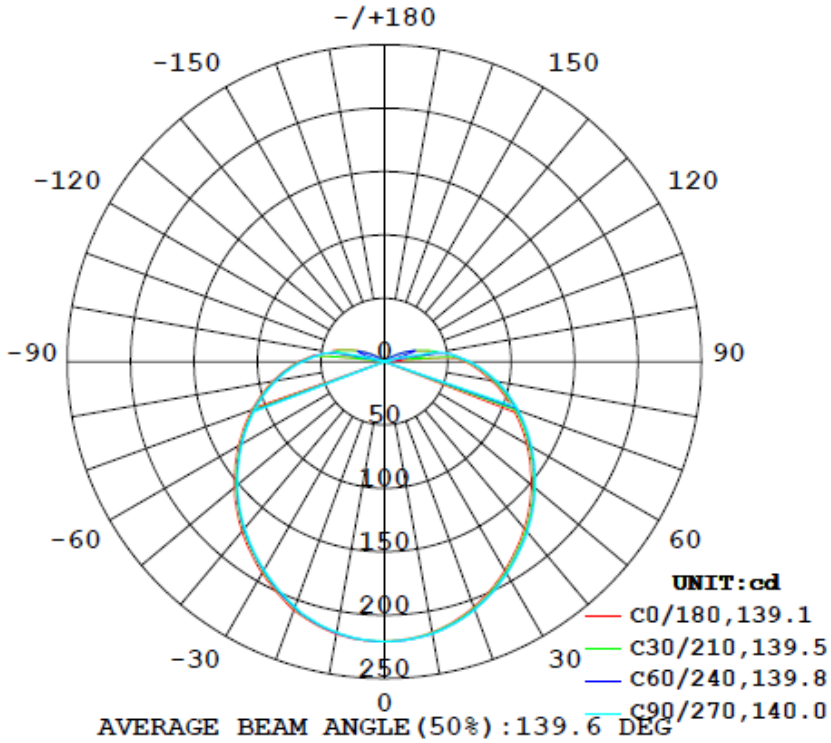
Electrical Data:

Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.1104	11.30	0.8531

Goniophotometer Data:

Parameter	Results
Total Luminous (lm)	941.8
Luminous Efficacy (lm/w)	83.35
Zonal Lumens Distribution (0-90°)	90.1%
Beam Angle (°)	139.6

Luminous Intensity Distribution Diagram:

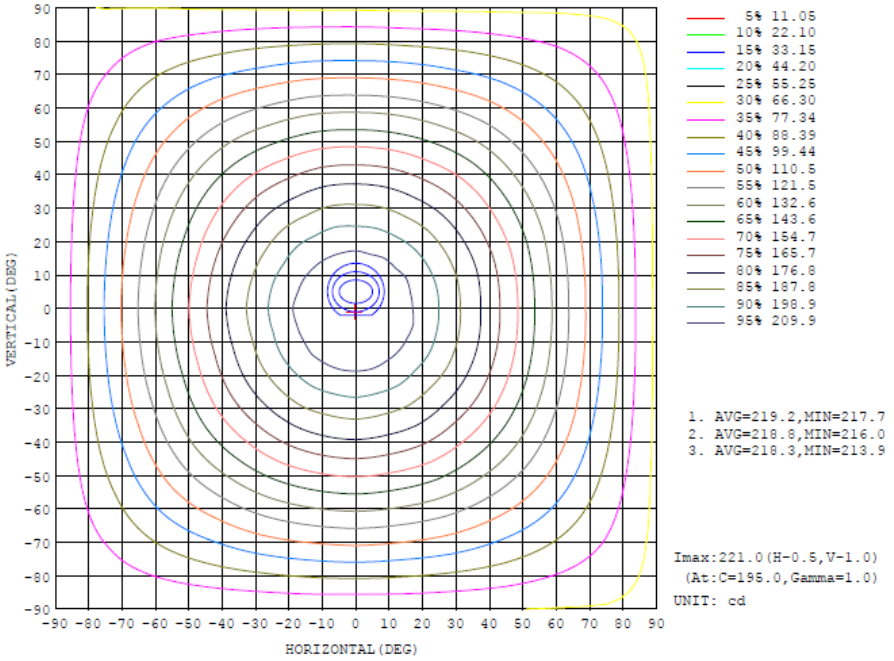


Zonal Flux Diagram:

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	216.7	217.6	217.8	218.0	218.1	217.0	216.8	216.7	0- 10	20.91	20.91	2.22,2.22
20	205.9	207.4	208.3	208.7	208.8	206.7	205.7	206.0	10- 20	60.16	81.07	8.61,8.61
30	190.2	191.6	193.1	192.8	192.6	191.2	189.7	190.1	20- 30	92.09	173.2	18.4,18.4
40	171.7	173.6	175.4	174.6	174.6	172.6	171.2	171.9	30- 40	114.3	287.5	30.5,30.5
50	151.3	153.6	155.4	154.2	154.5	152.4	150.9	151.4	40- 50	126.2	413.7	43.9,43.9
60	129.7	132.2	134.1	132.5	132.8	131.0	129.7	129.8	50- 60	127.4	541.1	57.5,57.5
70	107.8	110.6	112.5	110.7	111.1	109.4	108.2	108.2	60- 70	119.6	660.6	70.1,70.1
80	85.43	88.87	90.41	88.98	89.32	87.38	86.57	86.23	70- 80	104.6	765.2	81.3,81.3
90	63.56	66.68	67.25	66.84	67.48	65.43	64.37	64.02	80- 90	83.79	849.0	90.1,90.1
100	42.06	8.053	44.28	15.66	23.48	16.06	43.30	9.245	90-100	51.47	900.5	95.6,95.6
110	24.37	26.39	2.388	26.53	27.22	25.72	1.199	24.77	100-110	22.21	922.7	98,98
120	10.31	11.86	2.645	12.06	12.57	11.32	2.470	10.69	110-120	14.28	937.0	99.5,99.5
130	0.9425	2.341	0.7011	2.521	1.145	2.368	0.6815	2.064	120-130	4.313	941.3	99.9,99.9
140	0.0924	0.0749	0.0710	0.0726	0.1239	0.1072	0.1089	0.0848	130-140	0.3508	941.6	100,100
150	0.0758	0.0689	0.0497	0.0714	0.1227	0.1339	0.1059	0.1166	140-150	0.0568	941.7	100,100
160	0.0761	0.0746	0.0659	0.0701	0.1347	0.1345	0.1299	0.1310	150-160	0.0448	941.7	100,100
170	0.0965	0.0912	0.0652	0.0832	0.1398	0.1403	0.1092	0.1243	160-170	0.0290	941.7	100,100
180	0.1201	0.1202	0.1140	0.1093	0.1191	0.1186	0.1137	0.1090	170-180	0.0101	941.8	100,100
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 28.5 %									UNIT:lm		

Isocandela Diagram:



Luminous Distribution Intensity Data:

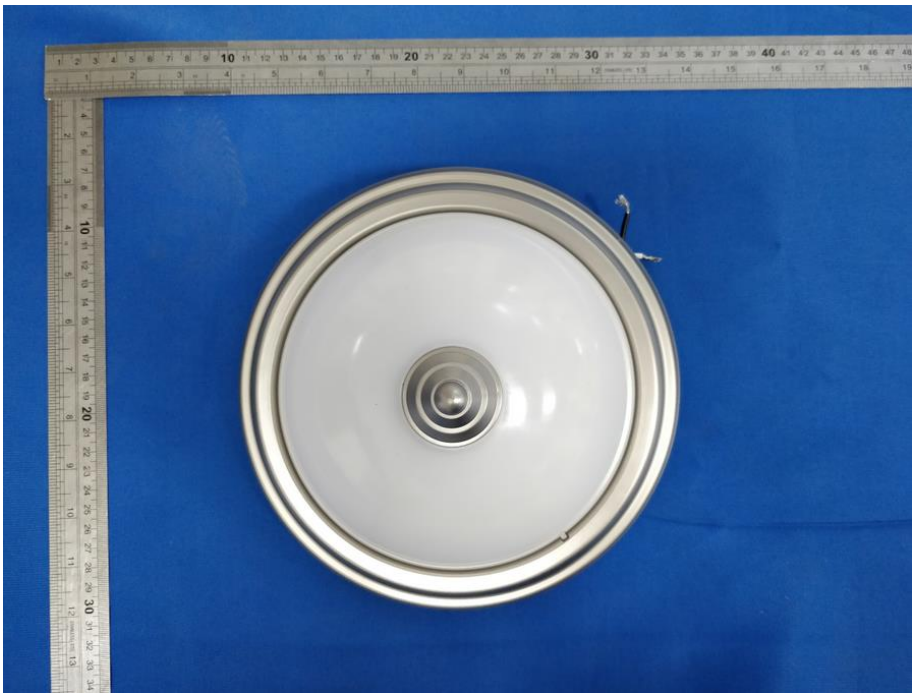
Table--1 UNIT: cd

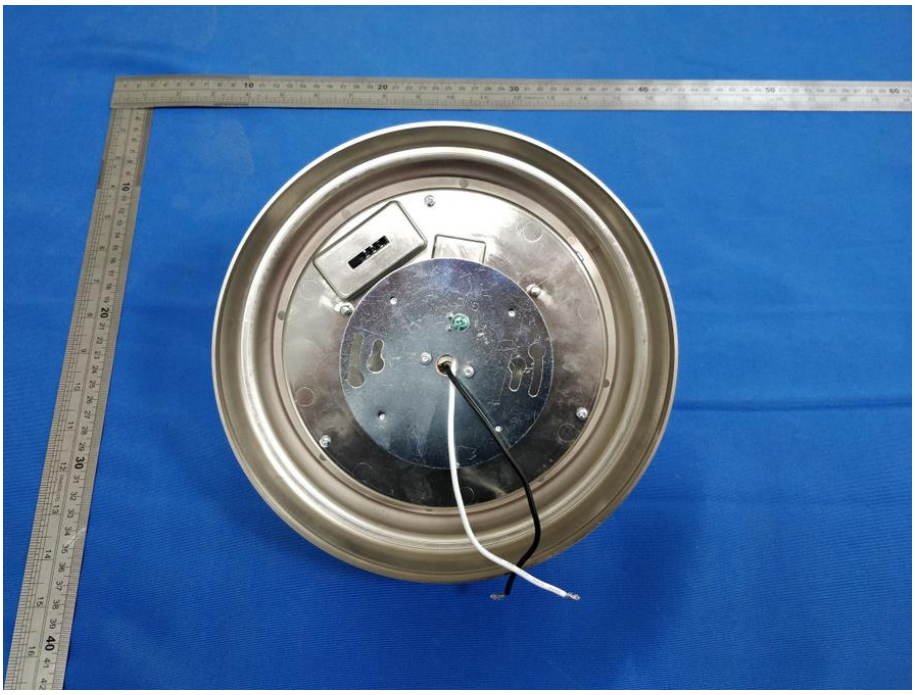
γ (DEG) \ C (DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
0	221	221	221	221	221	221	221	221	221	221	221	221	221	221	221	221	221	221	221
5	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	219	220
10	217	217	217	218	218	218	218	218	218	218	218	218	218	217	217	217	217	217	217
15	212	213	213	213	214	214	214	214	214	214	213	214	214	213	213	213	213	212	212
20	206	207	207	207	208	209	208	209	208	209	207	208	209	207	207	207	206	206	206
25	199	199	200	200	201	200	201	201	201	201	200	200	201	200	199	200	199	199	198
30	190	191	192	192	193	192	193	193	193	193	192	192	193	192	191	191	190	190	190
35	181	182	183	183	184	184	184	184	184	184	183	183	184	183	182	182	181	181	181
40	172	173	173	174	175	175	175	175	175	175	174	174	175	173	173	173	172	172	171
45	162	163	164	164	165	165	166	166	165	165	164	164	165	164	163	163	162	162	161
50	151	152	153	154	155	155	155	155	155	154	154	154	155	153	153	152	152	152	151
55	140	142	142	143	144	144	145	144	144	143	143	143	144	142	142	142	141	141	140
60	130	131	132	132	133	133	134	134	133	133	132	132	133	132	131	131	130	130	130
65	119	120	121	121	123	123	123	123	122	122	122	121	122	121	120	120	119	120	119
70	108	109	110	111	112	112	113	112	111	111	111	110	111	110	110	109	109	109	108
75	96.8	98.1	99.2	99.7	101	101	102	101	101	99.8	99.8	99.4	100	99.1	98.8	98.7	98.0	98.0	97.6
80	85.4	87.2	88.0	88.9	89.5	89.8	90.4	90.1	89.2	89.0	88.7	88.4	89.3	87.9	87.9	87.4	87.2	86.7	86.6
85	74.6	76.3	76.9	77.8	78.2	78.6	78.7	78.9	78.0	78.0	77.6	77.4	78.3	76.9	77.2	76.4	76.3	75.8	75.6
90	63.6	65.4	65.8	66.7	67.0	67.3	67.3	67.5	66.8	66.8	66.4	66.7	67.5	66.0	66.1	65.4	65.3	64.6	64.4
95	25.2	37.8	37.7	55.6	56.0	56.1	56.1	56.3	55.6	55.7	48.4	39.5	56.3	51.3	52.2	54.5	54.3	53.8	53.6
100	42.1	24.5	37.2	8.05	30.3	43.1	44.4	43.8	33.3	15.7	29.4	28.2	23.5	20.8	18.2	16.1	38.3	42.8	43.3
105	33.1	19.1	34.7	29.4	3.18	3.46	7.87	4.47	1.88	22.2	35.2	26.0	36.2	20.2	35.0	17.5	1.43	8.36	8.91
110	24.4	13.6	25.9	26.4	26.1	11.0	2.39	9.01	22.9	26.5	26.3	19.9	27.2	14.6	26.1	25.7	20.9	6.98	1.20
115	16.8	8.89	18.0	18.7	17.9	11.8	4.31	10.2	17.3	18.8	18.4	14.4	19.3	9.63	18.5	18.0	17.5	10.4	4.03
120	10.3	5.07	11.3	11.9	11.0	6.63	2.65	5.62	10.4	12.1	11.7	9.59	12.6	5.90	11.8	11.3	10.7	5.74	2.47
125	2.47	1.28	6.11	6.29	5.87	3.09	1.47	2.57	5.54	6.54	6.52	5.41	6.99	2.79	6.40	6.20	5.58	2.58	1.40
130	0.94	1.34	2.19	2.34	2.17	0.89	0.70	0.72	2.05	2.52	2.52	0.68	1.15	1.02	2.46	2.37	2.07	0.70	0.68
135	0.12	0.19	0.20	0.24	0.24	0.07	0.13	0.04	0.26	0.30	0.28	0.21	0.17	0.34	0.34	0.30	0.27	0.09	0.13
140	0.09	0.08	0.10	0.07	0.08	0.08	0.07	0.07	0.08	0.07	0.08	0.08	0.12	0.12	0.13	0.11	0.12	0.11	0.11
145	0.09	0.07	0.08	0.07	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.12	0.11	0.12	0.13	0.10	0.11	0.11
150	0.08	0.07	0.08	0.07	0.07	0.05	0.05	0.05	0.06	0.07	0.07	0.05	0.12	0.11	0.13	0.13	0.12	0.11	0.11
155	0.07	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.12	0.12	0.12	0.13	0.14	0.13	0.13
160	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.07	0.13	0.14	0.12	0.13	0.14	0.14	0.13
165	0.08	0.08	0.08	0.07	0.07	0.07	0.06	0.07	0.07	0.07	0.07	0.08	0.14	0.14	0.14	0.13	0.13	0.13	0.12
170	0.10	0.10	0.09	0.09	0.07	0.06	0.07	0.07	0.07	0.08	0.09	0.09	0.14	0.14	0.14	0.14	0.13	0.11	0.11
175	0.11	0.11	0.11	0.10	0.09	0.09	0.08	0.09	0.09	0.10	0.10	0.10	0.13	0.13	0.13	0.13	0.12	0.11	0.11
180	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.10	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.11	0.11	0.11

Table--2 UNIT: cd

γ (DEG) \ C (DEG)	285	300	315	330	345
0	221	221	221	221	221
5	220	219	219	220	220
10	217	216	217	217	217
15	212	212	212	213	212
20	206	205	206	206	206
25	198	198	199	198	199
30	190	189	190	190	191
35	181	180	181	181	182
40	172	171	172	172	173
45	162	161	162	162	163
50	151	151	151	151	152
55	140	140	141	140	141
60	130	129	130	130	130
65	119	118	119	119	120
70	108	108	108	108	109
75	97.4	96.9	97.6	97.1	97.7
80	86.1	86.0	86.2	86.3	86.3
85	75.1	75.0	75.3	75.6	75.5
90	64.0	64.0	64.0	64.3	64.4
95	53.2	53.2	53.2	37.0	23.3
100	41.5	32.2	9.25	27.2	30.2
105	7.27	1.72	20.6	33.7	23.3
110	7.12	20.4	24.8	25.0	17.2
115	9.99	16.7	17.2	17.6	11.8
120	5.48	10.1	10.7	11.0	7.55
125	2.45	5.21	5.74	5.79	3.57
130	0.65	1.84	2.06	2.07	0.51
135	0.08	0.19	0.19	0.20	0.19
140	0.11	0.10	0.08	0.11	0.11
145	0.10	0.09	0.11	0.11	0.10
150	0.11	0.11	0.12	0.12	0.10
155	0.12	0.13	0.12	0.13	0.13
160	0.13	0.13	0.13	0.13	0.13
165	0.12	0.12	0.12	0.13	0.14
170	0.11	0.11	0.12	0.13	0.13
175	0.11	0.10	0.12	0.13	0.13
180	0.10	0.11	0.11	0.11	0.11

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************

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