



Report No: NTCLR19090162 Report Version: V1.3

# 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): 514041##

Representative (Tested) Model: 51404141

### **Model Difference:**

- 1. Product is Field-adjustable product, Wattage can adjust 7W and 14W.
- 2. Where ## denotes color temperature 41~50 identifies 4000K.

Prepare by:

Perele Lai

Engineer: Derek Lai Date: 2019-09-24

Review by:

incer Twen

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.

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

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# NVLAP LAB CODE 600150-0

### **Product Information:**

Client Name:	ETI Solid State Lighting (Zhuhai) Ltd
Brand Name:	Commercial Electric
Model Number:	514041##(##=41-50)
Product Type:	Outdoor, Security Luminaires
Rating Input:	120Vac, 60Hz, 7W/14W
Declared CCT:	4000 K
Declared Light Output:	1200 lm
LED Manufacturer:	Samsung Electronics Co., LTD.
LED Model:	SPMWHX228FD5WAW0XX
LED Quantity:	30 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:	190914002-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
<b>Report Information:</b>	
Issued Date of Test Report:	2019-10-18
Revised Date of Test Report:	N/A
Test Report No.:	NTCLR19090162
Remark (If applicable):	1. Product tested with the default maximum wattage, the default maximum
	wattage is 14W.





# 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  $\pm$  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 $\pm$  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:**

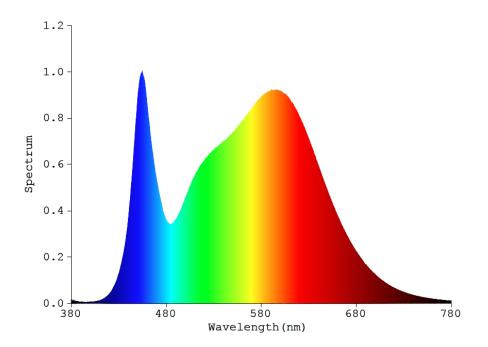
Test Cond	dition:				
Test Ambient (°C)	Test Humidity (%)	Orientation	Stabi	ilization Time (minute)	Test Time (minute)
24.6	41.0	Face Down		90	10
Electrical	l Data:				
Voltage (V)	Frequency (Hz)	Current (	<b>A</b> )	Wattage (W)	<b>Power Factor</b>
120.0	60	0.1238		14.25	0.9562

Color Data:

Parameter	Result
CCT(K)	4105
Ra	85.0
R9	17
Chromaticity, x	0.3757
Chromaticity, y	0.3728
Chromaticity, u'	0.2235
Chromaticity, v'	0.4991
Duv	-0.00044

Special Color Rendering								
R1	84	<b>R</b> 9	17					
R2	92	R10	81					
R3	96	R11	81					
R4	82	R12	64					
R5	84	R13	87					
R6	89	R14	98					
<b>R</b> 7	86	R15	78					
<b>R8</b>	67	-	-					

# Spectrum Diagram:







# **Goniophotemeter Test Results:**

Test Con	dition:							
Test Ambient (°C)	Test Humidity (%)	Orientatio	n Stab	ilization Time (minute)	Test Time (minute)			
24.6	41.0	Face Dowr	ı	90				
Electrica	Electrical Data:							
Voltage (V)	Frequency (Hz)	Curre	ent (A)	Wattage (W)	<b>Power Factor</b>			
120.0	60	0.1	238	14.25	0.9562			
Gonioph	otometer Data:							
	Parameter			Results				
	Total Lu	minous (lm)	1336.4					
	Luminous Effi	icacy (lm/w)	93.78					
Z	onal Lumens Distribu	ition (0-85°)		100%				

0.1%

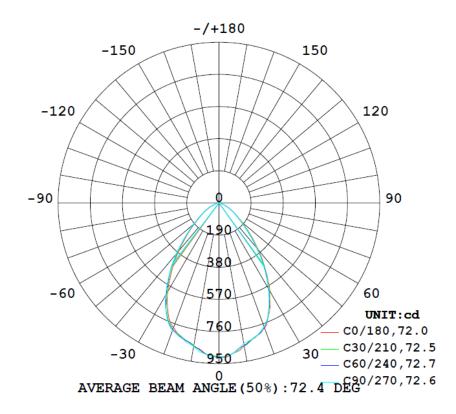
72.4

# **Luminous Intensity Distribution Diagram:**

Zonal Lumens Distribution (90-180°)

# LUMINOUS INTENSITY DISTRIBUTION DIAGRAM

Beam Angle (°)



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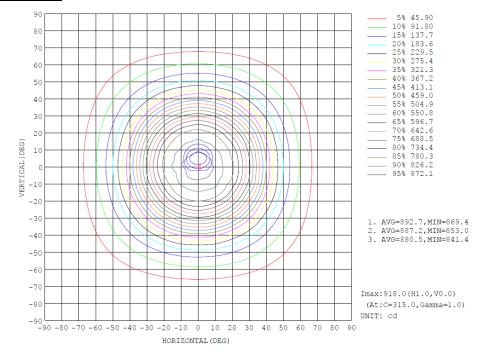


# Zonal Flux Diagram:

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	φ zone	$\Phi$ total	%lum,lam
10	854.4	857.4	842.6	855.6	856.8	860.3	861.9	867.2	0- 10	84.26	84.26	6.3,6.3
20	787.5	782.4	779.2	780.7	783.6	793.4	801.3	788.2	10- 20	232.7	317.0	23.7,23.7
30	602.8	595.6	583.4	587.1	605.7	616.6	628.2	615.9	20- 30	324.5	641.5	48,48
40	363.2	356.9	344.8	351.6	366.1	384.1	393.5	380.4	30- 40	302.2	943.6	70.6,70.6
50	181.3	173.0	167.3	172.1	182.1	189.3	194.6	191.3	40- 50	204.3	1148	85.9,85.9
60	86.55	83.73	81.34	83.76	89.23	93.69	96.25	92.73	50- 60	115.9	1264	94.6,94.6
70	30.03	28.10	26.47	28.61	32.20	33.69	35.00	33.50	60- 70	56.55	1320	98.8,98.8
80	1.740	1.012	0.6987	1.430	2.495	3.183	3.795	3.176	70- 80	15.01	1335	99.9,99.9
90	0	0	0	0	0	0	0	0	80- 90	0.3009	1336	99.9,99.9
100	0	0	0	0	0	0	0	0	90-100	0	1336	99.9,99.9
110	0	0	0	0	0	0	0	0	100-110	0	1336	99.9,99.9
120	0	0	0	0	0.0149	0.0144	0.0128	0.0134	110-120	0.0006	1336	99.9,99.9
130	0.0277	0.0332	0.0383	0.0338	0.1379	0.1470	0.1515	0.1404	120-130	0.0352	1336	100,100
140	0.1203	0.1309	0.1388	0.1266	0.2707	0.3159	0.3260	0.3048	130-140	0.1168	1336	100,100
150	0.2084	0.2309	0.2401	0.2199	0.4110	0.4724	0.4880	0.4582	140-150	0.1745	1336	100,100
160	0.3011	0.3161	0.2988	0.3075	0.5618	0.6024	0.5973	0.5779	150-160	0.1817	1336	100,100
170	0.3641	0.3858	0.3559	0.3452	0.5786	0.6085	0.5851	0.5682	160-170	0.1320	1336	100,100
180	0.4918	0.5045	0.4774	0.4614	0.4922	0.5052	0.4798	0.4621	170-180	0.0447	1336	100,100
DEG		LUI	AINOUS INTE	NSITY:cd	Less than	35% Percen	t = 7.8 %	1		UNI	T:lm	

# **Isocandela Diagram:**



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# TESTING NVLAP LAB CODE 600150-0

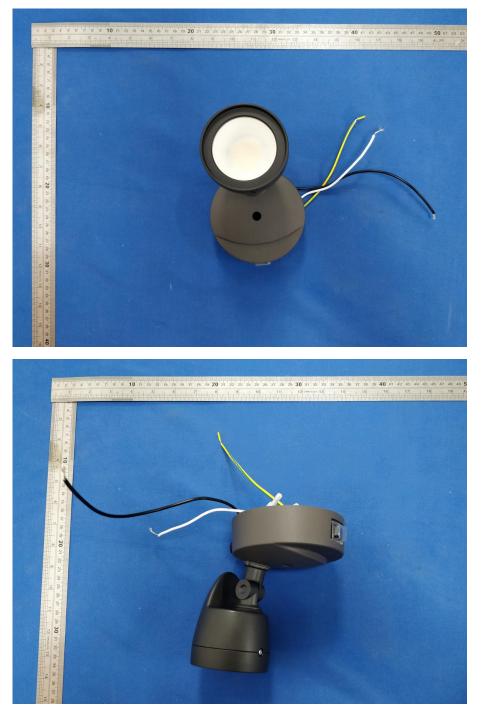
### **Luminous Distribution Intensity Data:**

C (DEG)																	T: cd		
(DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
0	912	912	912	912	912	912	912	912	912	912	912	912	912	912	912	912	912	912	91
	895	894	895	904	896	891	896	895	889	889	889	891	895	896	896	893	898	901	89
5					-				-										
10	854	859	858	857	858	858	843	853	856	856	853	854	857	864	855	860	860	860	86
15	819	823	820	829	824	822	822	819	821	826	823	815	825	822	827	824	828	829	83
20	787	789	776	782	783	779	779	780	785	781	779	784	784	789	795	793	797	799	80
25	706	714	700	707	696	694	699	699	695	702	699	709	712	712	723	727	731	726	73
30	603	606	595	596	587	585	583	581	583	587	587	601	606	608	613	617	623	621	62
35	479	486	475	477	467	469	462	466	465	471	471	482	484	490	498	500	508	509	51
40	363	364	356	357	347	350	345	348	347	352	354	363	366	370	377	384	386	389	39
45	261	262	255	253	245	245	241	246	247	249	252	260	263	264	274	273	279	280	28
50	181	181	176	173	169	168	167	168	170	172	174	177	182	185	189	189	192	194	19
55	126	125	122	121	119	119	118	119	119	121	123	125	129	130	133	135	137	138	13
60	86.5	86.2	84.1	83.7	82.1	82.1	81.3	81.9	82.0	83.8	84.9	86.7	89.2	89.9	92.1	93.7	95.5	96.3	96
65	54.8	54.8	52.5	52.3	50.9	50.8	50.4	51.1	51.4	53.0	53.9	55.7	57.5	57.3	59.6	60.1	61.6	61.5	61
70	30.0	30.0	28.2	28.1	27.0	26.9	26.5	27.2	27.4	28.6	29.4	30.8	32.2	32.0	33.4	33.7	34.8	34.6	35
75	12.4	12.6	11.2	11.2	10.3	10.4	9.97	10.6	10.6	11.5	11.8	13.0	13.9	13.6	14.9	14.7	15.6	15.4	15
80	1.74	1.70	1.10	1.01	0.69	0.73	0.70	0.96	1.14	1.43	1.60	2.00	2.49	2.50	3.05	3.18	3.57	3.66	3.1
85	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.07	0.07	0.07	0.07	0.0
90	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	0.0
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.
	0.00	0.00		0.00		0.00	0.00		-		-						-		0.
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	-
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	0.00	0.00	0.
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	0.00	0.00	0.00	0.
115	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.
120	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	0.01	0.01	0.01	0.01	0.
125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.07	0.07	0.07	0.07	0.07	0.
130	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.14	0.14	0.14	0.15	0.15	0.15	0.
135	0.07	0.08	0.08	0.08	0.09	0.08	0.09	0.09	0.08	0.08	0.08	0.07	0.21	0.22	0.22	0.23	0.24	0.24	0.3
140	0.12	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.13	0.13	0.12	0.12	0.27	0.28	0.30	0.32	0.32	0.33	0.
145	0.17	0.18	0.18	0.19	0.20	0.20	0.19	0.19	0.19	0.18	0.16	0.16	0.34	0.36	0.37	0.40	0.41	0.42	0.
150	0.21	0.22	0.23	0.23	0.24	0.24	0.24	0.24	0.23	0.22	0.20	0.20	0.41	0.43	0.44	0.47	0.49	0.50	0.
155	0.25	0.27	0.29	0.28	0.28	0.28	0.27	0.28	0.27	0.26	0.26	0.23	0.48	0.48	0.52	0.54	0.55	0.56	0.
160	0.30	0.32	0.33	0.32	0.31	0.31	0.30	0.32	0.31	0.31	0.31	0.29	0.56	0.56	0.58	0.60	0.61	0.61	0.
165	0.33	0.36	0.36	0.36	0.35	0.33	0.33	0.35	0.34	0.35	0.33	0.32	0.57	0.59	0.60	0.63	0.63	0.61	0.
170	0.36	0.39	0.39	0.39	0.36	0.35	0.36	0.36	0.36	0.35	0.34	0.35	0.58	0.59	0.60	0.61	0.61	0.59	0.
175	0.41	0.43	0.44	0.43	0.41	0.41	0.39	0.40	0.40	0.39	0.39	0.39	0.53	0.55	0.56	0.55	0.55	0.53	0.
180		0.45	0.44	0.43	0.41	0.41	0.35	0.40	0.40			0.39	0.55	0.55	0.50	0.55	0.55	0.33	0
	0.49	0.51	0.51	0.50	0.49	0.48	0.48	0.45	0.45	0.46	0.47	0.49	0.49	0.51	0.51	0.51 UNT	0.49 T: cd	0.48	0.4
Table2	0.49	0.51	0.51	0.50	0.49	0.48	0.48	0.45	0.45			0.49	0.49	0.51	0.51		0.49 T: cd	0.48	0.
Table2 C(DEG)	285	300	315	330	0.49 345	0.48	0.48	0.45	0.45			0.49	0.49	0.51	0.51			0.48	0.
Table2 C(DEG) (DEG)	285	300	315	330	345	0.48	0.48	0.45	0.45			0.49	0.49	0.51	0.51			0.48	0.4
Table2 C (DEG) (DEG) 0	285 912	300 912	315 912	330 912	3 <b>4</b> 5 912	0.48	0.48	0.45	0.45			0.49	0.49	0.51	0.51			0.48	0.4
Table2 C (DEG) (DEG) 0 5	285 912 894	300 912 898	315 912 905	330 912 909	345 912 904	0.48	0.48	0.45	0.45			0.49	0.49	0.51	0.51			0.48	0.4
Table2 C (DEG) (DEG) 0 5 10	285 912 894 860	300 912 898 861	315 912 905 867	330 912 909 868	345 912 904 858	0.48	0.48	0.45	0.45			0.49	0.49	0.51	0.51			0.48	0.4
Table2 C (DEG) (DEG) 0 5 10 15	285 912 894 860 826	300 912 898 861 830	315 912 905 867 828	330 912 909 868 829	345 912 904 858 826	0.48	0.48	0.45	0.45			0.49	0.49	0.51	0.51			0.48	0.4
Table2 C (DEG) (DEG) 0 5 10 15 20	285 912 894 860 826 799	300 912 898 861 830 792	315 912 905 867 828 788	330 912 909 868 829 788	345 912 904 858 826 784	0.48	0.48	0.45	0.45			0.49	0.49	0.51	0.51			0.48	0.
Table2 C (DEG) (DEG) 0 5 10 15 20 25	285 912 894 860 826 799 728	300 912 898 861 830 792 727	315 912 905 867 828 788 721	330 912 909 868 829 788 718	345 912 904 858 826 784 718	0.48	0.48	0.45	0.45			0.49	0.49	0.51	0.51			0.48	0.4
Table2 C (DEG) (DEG) 0 5 10 15 20 25 30	285 912 894 860 826 799 728 622	300 912 898 861 830 792 727 622	315 912 905 867 828 788 721 616	330 912 909 868 829 788 718 620	345 912 904 858 826 784 718 612	0.48	0.48	0.45	0.45			0.49	0.49	0.51	0.51			0.48	
Table2 C (DEG) (DEG) 0 5 10 15 20 25 30 35	285 912 894 860 826 799 728 622 504	300 912 898 861 830 792 727 622 504	315 912 905 867 828 788 721 616 497	330 912 909 868 829 788 718 620 496	345 912 904 858 826 784 718 612 491	0.48	0.48	0.45	0.45			0.49	0.49	0.51	0.51			0.48	
Table2 C (DEG) (DEG) 0 5 10 15 20 25 30 35 40	285 912 894 860 826 799 728 622 504 385	300 912 898 861 830 792 727 622 504 386	315 912 905 867 828 788 721 616 497 380	330 912 909 868 829 788 718 620 496 381	345 912 904 858 826 784 718 612 491 371	0.48	0.48	0.45	0.45			0.49	0.49	0.51	0.51			0.48	
Table2 C (DEG)   0 5   10 15   20 25   30 35   40 45	285 912 894 860 826 799 728 622 504 385 276	300 912 898 861 830 792 727 622 504 386 278	315 912 905 867 828 788 721 616 497 380 275	330 912 909 868 829 788 718 620 496 381 273	345 912 904 858 826 784 718 612 491 371 266	0.48	0.48	0.45	0.45			0.49	0.49	0.51	0.51			0.48	
Table2 C (DEG)   0 5   10 15   20 25   30 35   40 45   50 50	285 912 894 860 826 799 728 622 504 385 276 194	300 912 898 861 830 792 727 622 504 386 278 194	315 912 905 867 828 788 721 616 497 380 275 191	330 912 909 868 829 788 718 620 496 381 273 188	345 912 904 858 826 784 718 612 491 371 266 185	0.48	0.48	0.45	0.45			0.49	0.49	0.51	0.51			0.48	
Table2 C (DEG)   0 5   10 15   20 25   30 35   40 45	285 912 894 860 826 799 728 622 504 385 276 194 137	300 912 898 861 830 792 727 622 504 386 278 194 136	315 912 905 867 828 788 721 616 497 380 275 191 134	330 912 909 868 829 788 718 620 496 381 273 188 132	345 912 904 858 826 784 718 612 491 371 266 185 129	0.48	0.48	0.45	0.45			0.49	0.49	0.51	0.51			0.48	
Table2 C (DEG)   0 5   10 15   20 25   30 35   40 45   50 50	285 912 894 860 826 799 728 622 504 385 276 194	300 912 898 861 830 792 727 622 504 386 278 194	315 912 905 867 828 788 721 616 497 380 275 191	330 912 909 868 829 788 718 620 496 381 273 188	345 912 904 858 826 784 718 612 491 371 266 185	0.48	0.48	0.45	0.45			0.49	0.49	0.51	0.51			0.48	
Table2 C (DEG)   0 5   10 15   20 25   30 35   40 45   50 55	285 912 894 860 826 799 728 622 504 385 276 194 137 95.3 60.8	300 912 898 861 830 792 727 622 504 386 278 194 136 94.3 61.0	315 912 905 867 828 788 721 616 497 380 275 191 134 92.7	330 912 909 868 829 788 718 620 496 381 273 188 132	345 912 904 858 826 784 718 612 491 371 266 185 129 89.2		0.48	0.45	0.45			0.49							
Table2 C (DEG)   0 5   10 15   20 30   35 40   45 50   55 60	285 912 894 860 826 799 728 622 504 385 276 194 137 95.3 60.8	300 912 898 861 830 792 727 622 504 386 278 194 136 94.3 61.0	315 912 905 867 828 721 616 497 380 275 191 134 92.7 59.6 33.5	330 912 909 868 829 788 718 620 496 381 273 188 132 91.3 59.1 33.2	345 912 904 858 826 784 718 612 491 371 266 185 129 89.2 57.1		0.48	0.45	0.45			0.49							
Table2 C (DEG)   C (DEG) 0   0 5   10 15   20 25   30 35   40 45   55 55   55 60   65 65	285 912 894 860 826 799 728 622 504 385 276 194 137 95.3 60.8 34.4 15.3	300 912 898 861 830 792 727 622 504 386 278 194 136 94.3 61.0 34.4 15.5	315 912 905 867 828 788 721 616 497 380 275 191 134 92.7 59.6 33.5 14.7	330 912 909 868 829 788 718 620 496 381 273 188 132 91.3 59.1	345 912 904 858 826 784 718 612 491 371 266 185 129 89.2 57.1		0.48	0.45	0.45			0.49							
Table2 C (DEG)   0 5   10 15   20 25   30 35   40 45   50 55   60 65   70 70	285 912 894 860 826 799 728 622 504 385 276 194 137 95.3 60.8 34.4 15.3	300 912 898 861 830 792 727 622 504 386 278 194 136 94.3 61.0 34.4	315 912 905 867 828 788 721 616 497 380 275 191 134 92.7 59.6 33.5 14.7	330 912 909 868 829 788 718 620 496 381 273 188 132 91.3 59.1 33.2	345 912 904 858 826 784 718 612 491 371 266 185 185 185 189 289.2 57.1 31.7 13.4		0.48	0.45	0.45										
Table2 C (DEG)   0 5   10 15   20 25   30 35   40 45   55 60   65 70   75 75	285 912 894 860 826 799 728 622 504 385 276 194 137 95.3 60.8 34.4 15.3 3.65	300 912 898 861 830 792 727 622 504 386 278 194 136 94.3 61.0 34.4 15.5	315 912 905 867 828 788 721 616 497 380 275 191 134 92.7 59.6 33.5 14.7 3.18	330 912 909 868 829 788 718 620 496 381 273 188 132 91.3 359.1 33.2 14.6	345 912 904 858 826 784 718 612 491 371 266 185 129 89.2 57.1 31.7 13.4 2.31		0.48		0.45										
Table2 C (DEG)   0 5   10 15   20 30   35 40   45 50   55 60   65 70   75 80	285 912 894 860 826 799 728 622 504 385 276 194 137 95.3 60.8 34.4 15.3 3.65 0.06	300 912 898 861 830 792 727 622 504 386 278 194 336 94.3 61.0 34.4 15.5 3.55	315 912 905 867 828 721 616 497 380 275 191 134 92.7 59.6 33.5 14.7 3.18 0.05	330 912 909 868 829 788 718 620 496 381 273 381 132 91.3 359.1 33.2 14.6 2.86	345 912 904 858 826 784 491 371 266 185 129 89.2 57.1 31.7 13.4 2.31 0.04		0.48												
Table2 C (DEG)   C (DEG) 0   0 0   10 15   20 25   30 35   40 45   50 55   60 65   70 75   80 85	285 912 894 860 826 799 728 622 504 385 276 194 137 95.3 60.8 34.4 15.3 3.65 0.06	300 912 898 861 830 792 504 386 278 194 136 94.3 61.0 3.4.4 15.5 3.55 0.05	315 912 905 867 828 721 616 497 380 275 191 134 92.7 59.6 33.5 14.7 3.18 0.05	330 912 909 868 829 788 620 496 381 273 188 132 91.3 359.1 33.2 14.6 2.86 0.04 0.00	345 912 904 888 826 784 491 371 266 185 129 89.2 57.1 31.7 31.7 31.7 31.7 31.0 4 0.04 0.00		0.48												
Table2 C (DEG)   0 5   10 15   20 25   30 35   40 45   50 55   60 65   70 75   80 85   90 90	285 912 894 860 826 799 728 622 504 385 276 194 137 95.3 60.8 34.4 3.45.5 3.3.65 0.06 0.00	300 912 898 861 830 792 504 386 278 194 136 94.3 61.0 34.4 15.5 3.555 0.05 0.00	315 912 905 867 828 721 616 616 497 380 275 191 134 92.7 59.6 33.5 33.5 3.18 0.05 0.00	330 912 909 868 829 788 620 496 381 273 188 132 91.3 359.1 33.2 14.6 2.86 0.04 0.00	345 912 904 888 826 784 491 371 266 185 129 89.2 57.1 31.7 31.7 31.7 31.7 31.0 4 0.04 0.00														
Table2   C (DEG)   0   5   10   15   20   30   35   40   55   60   65   70   75   80   90   95	285 912 894 860 826 622 504 385 276 194 137 95.3 60.8 34.4 15.3 3.65 0.06 0.00 0.000 0.000	300 912 898 861 792 727 622 504 386 278 94.3 61.0 34.4 15.5 3.55 0.05 0.050 0.000	315 912 905 867 788 721 616 497 380 275 191 134 92.7 59.6 33.5 14.7 3.18 0.05 0.000 0.000	330 912 909 868 829 788 718 620 496 381 273 381 273 188 132 91.3 359.1 33.2 14.6 2.86 0.04 0.000 0.000	345 912 904 858 826 784 718 612 901 266 185 129 2 89.2 57.1 31.7 13.4 2.31 0.04 0.000 0.000														
Table2   C (DEG)   0   5   10   15   20   335   40   45   50   55   60   65   70   75   80   85   90   95   100	2885 912 894 860 826 799 728 622 504 385 276 194 137 95.3 3.65 0.06 0.00 0.00 0.000 0.000	300 912 898 861 830 792 727 622 504 386 278 194 136 94.3 361.0 34.4 15.5 3.55 0.00 0.00 0.00 0.00	315 912 905 867 788 721 616 497 380 275 191 134 92.7 59.6 33.5 14.7 3.18 0.05 0.000 0.000	330 912 909 868 829 788 718 620 496 381 273 188 132 91.3 312 33.2 14.6 2.86 0.04 0.000 0.000	345 912 904 858 858 826 784 718 612 491 266 185 129 89.22 57.1 31.7 13.4 2.31 0.00 0.00 0.000 0.000														
Table2 C (DEG)   C (DEG) 0   0 5   10 15   20 25   30 35   40 45   50 55   60 65   70 75   80 85   90 95   100 105	2855 912 894 860 826 799 728 622 504 385 504 194 137 95.3 60.8 34.4 15.3 3.65 0.06 0.00 0.000 0.000 0.000	300 912 898 861 830 792 504 386 278 94.3 61.0 34.4 15.5 0.05 0.00 0.00 0.00 0.00 0.00	315 912 905 867 828 788 721 380 275 191 334 92.7 59.6 33.5 14.7 3.18 0.05 0.00 0.00 0.00 0.00	330 912 909 868 829 788 718 620 496 381 273 188 132 91.3 312 91.3 33.2 14.6 2.86 0.004 0.000 0.000	345 912 904 858 826 784 718 612 491 371 266 185 57.1 31.7 13.4 2.31 0.04 0.00 0.000 0.000 0.000 0.000														
Table2   C (DEG)   0   5   10   15   20   33   34   55   60   65   70   75   80   90   95   100   105   110   115	2855 912 894 860 826 799 728 622 504 385 276 194 137 95.3 60.8 34.4 15.3 3.65 0.06 0.000 0.000 0.000 0.000 0.000	300 912 898 861 830 792 727 622 504 386 278 194 336 136 94.3 61.0 34.4 15.5 3.55 0.05 0.00 0.00 0.00 0.000 0.000 0.000	315 912 905 867 887 788 788 788 721 380 275 191 3380 275 191 334 92.7 59.6 33.5 14.7 3.18 0.05 0.000 0.000 0.000 0.000 0.000	330 912 909 868 829 788 718 620 436 381 273 188 91.3 33.2 14.6 2.86 0.04 0.00 0.00 0.00 0.00 0.000 0.000	345 912 904 858 826 784 718 612 491 371 266 185 89.2 57.1 31.7 13.4 2.31 2.9 90.2 57.1 31.7 13.4 0.00 0.00 0.000 0.000 0.000														
Table2   C (DEG)   0   5   10   15   20   335   40   45   50   55   60   65   70   75   80   85   90   95   100   105   110	2885 912 894 860 826 799 728 622 504 385 276 194 137 95.3 60.8 34.4 15.3 3.65 0.06 0.00 0.000 0.000 0.000 0.000 0.000	300 912 898 861 830 792 504 386 278 134 136 94.3 61.0 94.3 3.55 0.05 0.000 0.000 0.000 0.000 0.000 0.000 0.000	315 912 905 867 828 788 497 380 275 1616 497 380 275 191 134 92.7 59.6 33.5 14.7 3.18 0.00 0.000 0.000 0.000 0.000 0.000 0.001	330 912 909 868 829 788 620 496 381 132 91.3 59.1 14.6 2.86 0.04 2.86 0.00 0.00 0.00 0.00 0.00 0.00 0.00	345 912 904 858 826 784 612 491 371 266 89.2 57.1 135 129 89.2 57.1 13.4 2.31 0.04 2.31 0.00 0.000 0.000 0.000 0.001														
Table2 C (DEG)   C (DEG) 0   0 5   10 15   20 25   30 35   40 45   50 55   60 65   70 75   80 85   90 95   100 105   110 120   125 125	285 912 894 860 826 799 728 622 504 385 276 194 137 95.3 60.8 34.4 15.3 3.65 0.00 0.000 0.000 0.000 0.000 0.000	300 912 899 861 830 727 504 386 278 94.3 61.0 34.4 135 53.55 0.00 0.00 0.000 0.000 0.000 0.000 0.001 0.001 0.011	315 912 905 867 828 721 636 497 380 275 191 134 92.7 59.6 33.5 14.7 3.18 0.00 0.00 0.000 0.000 0.000 0.000 0.001 0.001 0.001	330 912 909 868 829 718 620 496 381 273 188 132 331 59.1 33.2 14.6 0.04 0.00 0.000 0.000 0.000 0.000 0.001 0.011 0.017	345 912 904 858 826 7784 718 612 491 266 185 129 57.1 31.7 13.4 89.2 57.1 31.7 13.4 0.00 0.000 0.000 0.000 0.000 0.001 0.001 0.001														
Table2   C (DEG)   0   5   10   15   20   30   35   40   55   60   55   60   70   75   80   90   95   100   115   120   125   130	285 912 894 860 826 799 728 622 504 385 276 194 137 95.3 60.8 34.4 15.3 3.65 0.06 0.00 0.00 0.00 0.000 0.000 0.000 0.017 0.077	300 912 898 861 830 792 727 622 504 386 94.3 61.0 34.4 15.5 3.55 0.00 0.00 0.00 0.00 0.00 0.00 0	315 912 905 867 828 788 787 191 134 92.7 59.6 33.5 14.7 3.18 0.05 0.00 0.00 0.00 0.00 0.00 0.00 0.0	330 912 909 868 829 788 718 620 496 381 122 318 132 14.6 2.86 2.86 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	345 912 904 856 826 784 718 612 491 266 185 129 89.2 57.1 31.7 13.4 2.31 31.7 13.4 0.00 0.00 0.00 0.00 0.000 0.000 0.017 0.014														
Table2   C (DEG)   0   5   10   15   20   30   35   40   55   60   55   60   65   75   80   95   100   105   110   115   120   130   135	285 912 894 860 826 799 728 622 504 385 276 194 137 95.3 3.60 80.8 34.4 15.3 3.65 0.06 0.00 0.000 0.000 0.000 0.000 0.001 0.001 0.015 0.24	300 912 898 861 830 792 727 622 504 386 94.3 378 413 5.5 3.55 0.05 3.4.4 15.5 3.55 0.05 0.00 0.00 0.00 0.000 0.000 0.001 0.001 0.015 0.15	315 912 905 867 828 788 788 721 616 497 380 92.7 191 134 92.7 191 134 92.7 3.19 0.05 0.00 0.00 0.000 0.000 0.000 0.000 0.000 0.000 0.001 0.001 0.014 0.142	330 912 909 868 829 788 620 496 273 188 132 91.3 33.2 14.6 2.86 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	345 912 904 858 826 784 612 491 371 266 185 129 89.2 266 185 129 89.2 265 7.1 31.7 13.4 2.31 0.04 0.00 0.000 0.000 0.000 0.000 0.000 0.000 0.001 0.001 0.001														
Table2   C (DEG)   0   5   10   15   20   35   40   55   60   65   70   75   80   85   100   105   100   110   110   115   120   135   140	285 912 894 860 826 799 728 622 504 385 276 194 137 95.3 60.8 34.4 15.3 3.65 0.06 0.00 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.000000	300 912 898 861 830 792 504 386 278 194 136 94.3 61.0 94.3 3.55 0.05 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.000000	315 912 905 867 828 788 721 616 497 380 275 191 134 92.7 59.6 33.5 14.7 3.18 0.05 0.00 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.000000	330 912 909 868 829 788 620 496 381 273 188 132 91.3 359.1 33.2 14.6 2.86 0.04 0.00 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.000000	345 912 904 858 826 784 718 612 491 371 266 185 129 89.2 57.1 31.7 13.4 2.31 0.04 0.00 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.000000														
Table2 C (DEG)   C (DEG) 0   0 5   10 15   20 25   30 35   40 45   50 55   60 60   65 70   75 80   85 90   95 100   105 110   115 120   125 130   135 140   145 140	285 912 894 860 826 504 7799 728 622 504 137 95.3 60.8 34.4 15.3 60.6 0.00 0.00 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.00100000000	300 912 898 861 792 727 622 504 386 278 194 336 278 194 336 10 34.4 15.5 0.00 0.00 0.00 0.000 0.000 0.000 0.000 0.000 0.000 0.00100000000	315 912 905 867 828 721 616 497 788 721 616 330 275 191 134 92.7 59.6 33.5 14.7 33.18 0.05 0.00 0.000 0.000 0.000 0.000 0.000 0.001 0.001 0.011 0.014 0.22	330 912 909 868 829 718 620 496 381 273 188 132 91.3 33.2 14.6 0.04 0.00 0.00 0.000 0.000 0.000 0.000 0.001 0.001 0.011 0.011 0.011 0.014 0.218 0.288 0.286	345 912 904 856 826 7784 718 612 491 266 185 57.1 31.7 13.4 9.2 257.1 31.7 13.4 0.00 0.00 0.000 0.000 0.000 0.000 0.000 0.001 0.001 0.001 0.011 0.014 0.214 0.28 8 0.28 5														
Table2   C(DEG)   0   5   10   15   20   30   35   40   45   50   55   60   65   70   75   80   90   95   100   115   120   130   135   140   145   150	285 912 894 860 826 799 728 622 504 385 276 194 137 95.3 3.65 60.8 34.4 15.3 3.65 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	300 912 898 861 830 792 727 622 504 386 6 94.3 366 0.04 0.00 0.00 0.00 0.00 0.00 0.00 0.	315 912 905 867 828 721 616 497 380 92.7 59.6 33.5 14.7 3.16 3.35 14.7 3.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	330 912 909 868 829 718 620 496 381 122 318 132 14.6 2.86 2.86 0.04 0.00 0.00 0.00 0.00 0.00 0.00 0.0	345 912 904 856 826 784 718 612 491 371 226 185 129 89.2 257.1 31.7 13.4 2.31 31.7 13.4 0.00 0.00 0.00 0.00 0.000 0.000 0.000 0.000 0.000 0.001 0.000 0.014 0.212 0.35 0.35														
Table2   C (DEG)   0   5   10   15   20   30   35   40   45   50   55   60   55   60   75   80   95   100   105   110   115   120   125   130   135   140   145   150   155	285 912 894 860 826 799 728 622 504 385 276 194 137 95.3 3.65 0.06 0.00 0.00 0.00 0.00 0.00 0.00 0	300 912 898 861 830 792 727 622 504 386 94.3 386 94.3 386 194 33.55 0.05 0.05 0.00 0.00 0.00 0.00 0.0	315 912 905 867 828 788 721 616 497 380 92.7 191 134 92.7 191 134 92.7 59.6 33.5 14.7 3.18 0.05 0.00 0.00 0.00 0.00 0.00 0.00 0.0	330 912 909 868 829 788 620 496 381 127 331 188 132 91.3 59.1 33.2 14.6 2.86 0.00 0.00 0.00 0.00 0.0000 0.0000 0.0000 0.0000 0.0000 0.000000	345 912 904 858 826 784 718 612 491 266 185 129 266 185 129 265 7.1 31.7 13.4 2.31 3.17 13.4 0.00 0.00 0.00 0.00 0.0000 0.000 0.000 0.000 0.0000 0.0000 0.0000 0.0000 0.0000 0.000000														
Table2   C(DE0)   (DE0)   0   5   10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95   100   105   110   115   120   125   130   135   140   145   150   155   160	285 912 894 860 826 799 728 622 504 385 276 194 137 95.3 3.65 0.06 0.00 0.00 0.00 0.00 0.00 0.00 0	300 912 898 861 830 792 504 386 94.3 61.0 94.3 61.0 94.3 61.0 0.00 0.00 0.00 0.00 0.00 0.00 0.00	315 912 905 867 828 721 616 497 788 721 330 275 191 134 92.7 59.6 33.5 14.7 33.18 0.05 0.00 0.00 0.00 0.00 0.00 0.00 0.0	330 912 909 866 829 718 620 496 381 273 188 132 91.3 59.1 33.2 14.6 0.04 0.00 0.00 0.00 0.00 0.0000 0.000000	345 912 904 856 826 718 612 491 266 185 271 226 129 89.2 57.1 31.7 13.4 2.31 0.04 0.00 0.00 0.0000 0.0000 0.000000														
Table2   C (DEG)   0   5   10   15   20   30   35   40   45   50   55   60   55   60   75   80   95   100   105   110   115   120   125   130   135   140   145   150   155	285 912 894 860 826 799 728 622 504 385 276 194 137 95.3 3.65 0.06 0.00 0.00 0.00 0.00 0.00 0.00 0	300 912 898 861 830 792 727 622 504 386 94.3 386 94.3 386 194 33.55 0.05 0.05 0.00 0.00 0.00 0.00 0.0	315 912 905 867 828 721 616 497 788 721 330 275 191 134 92.7 59.6 33.5 14.7 33.18 0.05 0.00 0.00 0.00 0.00 0.00 0.00 0.0	330 912 909 866 829 718 620 496 381 273 188 132 91.3 59.1 33.2 14.6 0.04 0.00 0.00 0.00 0.0000 0.000000	345 912 904 856 826 718 612 491 266 185 271 226 129 89.2 57.1 31.7 13.4 2.31 0.04 0.00 0.00 0.0000 0.0000 0.000000														
Table2   C(DE0)   (DE0)   0   5   10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95   100   105   110   115   120   125   130   135   140   145   150   155   160	285 912 894 860 826 799 728 622 504 385 276 194 137 95.3 3.65 0.06 0.00 0.00 0.00 0.00 0.00 0.00 0	300 912 898 861 830 792 504 386 94.3 61.0 94.3 61.0 94.3 61.0 0.00 0.00 0.00 0.00 0.00 0.00 0.00	315 912 905 867 828 721 616 497 788 721 616 330 275 191 134 92.7 59.6 33.5 14.7 33.18 0.05 0.00 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.001 0.011 0.014 0.22 0.38 0.38 0.38 0.38 0.38 0.55 0.55	330 912 909 868 829 718 620 496 381 273 188 132 91.3 33.2 14.6 0.04 0.00 0.00 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.001 0.001 0.001 0.001 0.014 0.214 0.218 0.288 0.588 0.588	345 912 904 856 826 7784 718 612 491 266 185 57.1 31.7 13.4 9.2 57.1 31.7 13.4 0.00 0.00 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.001 0.011 0.014 0.214 0.215 0.429														
Table2   C (DEG)   0   5   10   5   20   25   30   35   60   65   50   55   60   65   70   75   80   85   90   95   100   105   110   125   130   125   130   145   150   155   160   165	285 912 894 860 826 504 7799 728 622 504 137 95.3 60.8 34.4 15.3 60.8 34.4 15.3 60.6 0.00 0.00 0.00 0.00 0.00 0.00 0.	300 912 898 861 792 727 622 504 386 278 194 336 278 194 336 10 34.4 15.5 0.00 0.00 0.00 0.00 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.000000	315 912 905 867 828 721 616 497 788 721 616 497 191 134 92.7 59.6 33.5 14.7 3.18 3.35 0.05 0.00 0.00 0.00 0.00 0.00 0.00	330 912 909 868 829 718 620 496 381 273 188 132 91.3 33.2 14.6 0.04 0.00 0.00 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.001 0.001 0.001 0.001 0.014 0.214 0.218 0.288 0.588 0.588	345 912 904 826 784 718 612 491 371 226 185 129 89.2 257.1 31.7 13.4 2.31 31.7 13.4 2.31 0.04 0.00 0.00 0.00 0.00 0.00 0.00 0.0														





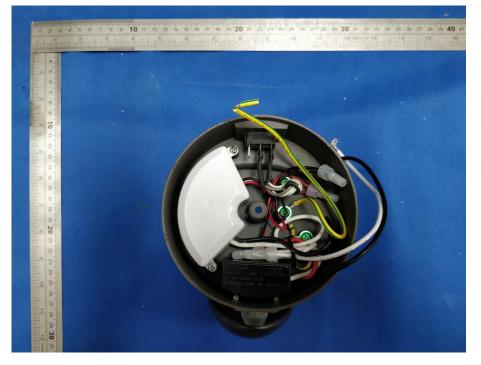
# **Photo of Sample:**



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# **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

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