



Report No: NTCR18080021 Report Version: V1.2

# LM-79-08 Test Report

For

# **ELEC-TECH INTERNATIONAL CO LTD**

No. 1 Jinfeng Road, Tangjiawan Town, Xiangzhou District, Zhuhai City, Guangdong Province, P.R.China, 519085

# **LED Cealing Lamp**

Model Name(s):

536021##

536031##

Representative (Tested) Model: 53603141

Model Difference: All model has the same construction, except 536021## has Motion Sensor, and 536031## has Switch. ##=41-50 identifies 4000K.

Prepare by:

Perele Lai

Engineer: Derek Lai Date: 2018-08-15

Review by:

I fincet Then

Technical Lead: Vincent Yuan Issue Date: 2018-09-07 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: 86-769-89874553 Website: http://www.ntc-cert.com





#### **Product Information:**

Client Name:	ELEC-TECH INTERNATIONAL CO LTD
Brand Name:	Commercial Electric
Model Number:	536021##, 536031## (##=41-50)
Product Type:	Indoor, Inseparable SSL Luminaire
Rating Input:	120Vac, 60Hz, 16W
Declared CCT:	4000K
Declared Light Output:	1200lm
LED Manufacturer:	Samsung
LED Model:	SPMWHX2286XXXXXXXXX
LED Quantity:	110 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:	2018-07-31
Quantity of Receipt Samples:	3 pcs
Sample Number:	S18073101-S1~S3
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:	2018-09-07
Revised Date of Test Report:	N/A
Test Report No.:	NTCR18080021
Remark (If applicable):	All model has the same construction, except 536021## has Motion Sensor, and
	536031## has Switch. Model 536031## conduct all tests.





# Test Specification:

2018-08-01
1. Total Luminous Flux
2. Luminous Distribution Intensity
3. Luminous Efficacy
4. Correlated Color Temperature
5. Color Rendering Index
6. Chromaticity Coordinate
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:**

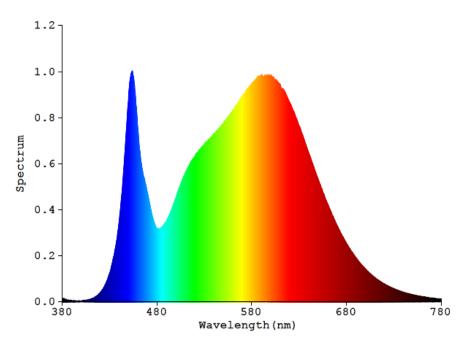
Test Condition:											
Test Ambient (°C)	Test Humidity (%)	Orientation	Stabi	lization Time (minute)	Test Time (minute)						
25.0	40.0	Face Down		90	10						
Electrical Data:											
Voltage (V)	Frequency (Hz)	Current (A	A)	Wattage (W)	<b>Power Factor</b>						
120	60	0.1336		15.92	0.9902						

**Color Data:** 

Color Data.	
Parameter	Result
CCT(K)	3890
Color Rendering Index (CRI)	84.0
R9	13
Chromaticity, x	0.3861
Chromaticity, y	0.3819
Chromaticity, u'	0.2267
Chromaticity, v'	0.5047
Duv	0.00081

Special Color Rendering								
<b>R</b> 1	82	<b>R</b> 9	13					
R2	91	R10	78					
R3	96	R11	81					
R4	82	R12	63					
R5	82	R13	85					
R6	87	R14	98					
<b>R</b> 7	86	R15	76					
<b>R8</b>	65	-	-					

# **Spectrum Diagram:**







## **Goniophotemeter Test Results:**

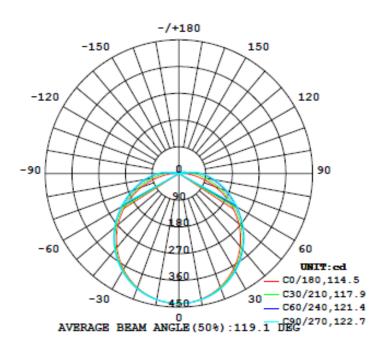
Tes	st Cond	lition:									
Test Ambien	nt (°C)	Test Humidity (%)	Orientation	n Stabi	Test Time (minute)						
25.0		40.0	Face Down	1	90	25					
Ele	Electrical Data:										
Voltage	(V)	Frequency (Hz)	Curre	nt (A)	Wattage (W)	<b>Power Factor</b>					
120		60	0.1	336	0.9902						
Go	oniopho	tometer Data:									
		Parameter			Results						
		Total Lui	minous (lm)		1477.61						
		Total Luminous per	foot (lm/ft)	N/A							
		Luminous Effi	cacy (lm/w)	92.82							
	Zo	onal Lumens Distribu	tion (0-90°)		95.9%						

#### **Luminous Intensity Distribution Diagram:**

#### LUMINOUS INTENSITY DISTRIBUTION DIAGRAM

119.1

Beam Angle (°)



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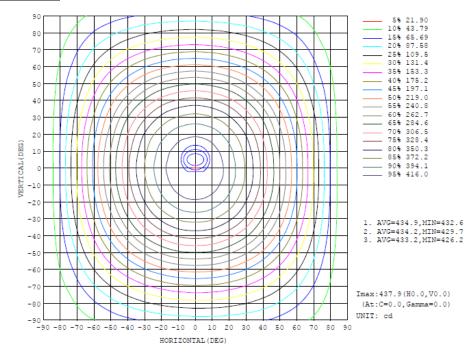
# NVLAP LAB CODE 600150-0

## Zonal Flux Diagram:

ZONAL FLUX DIAGRAM:

۲	C0	C45	C90	C135	C180	C225	C270	C315	Y	o zone	<pre>     total </pre>	<lum, lam<="" th=""></lum,>
10	429.7	430.7	431.5	430.7	431.0	430.5	431.3	429.6	0- 10	41.43	41.43	2.8,2.8
20	406.3	410.6	412.4	410.9	408.9	410.6	412.5	408.8	10- 20	119.2	160.6	10.9,10.9
30	368.9	377.2	380.2	377.6	372.8	377.3	380.4	374.8	20- 30	182.0	342.6	23.2,23.2
40	320.2	332.1	336.5	332.4	324.9	332.1	336.3	328.9	30- 40	221.9	564.5	38.2,38.2
50	262.3	278.2	284.0	278.3	267.6	277.8	283.1	274.0	40- 50	234.7	799.2	54.1,54.1
60	198.0	218.6	227.1	217.7	202.6	218.0	225.7	213.6	50- 60	220.2	1019	69,69
70	129.6	158.8	172.5	155.8	133.9	157.4	168.8	152.5	60- 70	182.7	1202	81.4,81.4
80	63.32	106.6	123.3	101.6	66.74	103.7	118.7	98.86	70- 80	132.6	1335	90.3,90.3
90	25.39	63.84	78.13	57.62	23.89	59.72	74.60	56.56	80- 90	82.50	1417	95.9,95.9
100	18.18	14.68	0.4912	11.37	15.57	15.86	0.8066	12.56	90-100	28.42	1446	97.8,97.8
110	12.78	14.02	16.16	10.85	10.35	8.959	13.77	12.41	100-110	13.74	1459	98.8,98.8
120	9.315	6.746	7.485	4.875	7.343	4.611	5.415	6.937	110-120	8.375	1468	99.3,99.3
130	3.224	4.099	2.486	4.002	2.587	3.492	2.439	4.859	120-130	4.056	1472	99.6,99.6
140	3.309	3.151	2.867	3.219	3.118	3.038	2.637	3.070	130-140	2.601	1474	99.8,99.8
150	2.205	1.706	2.879	2.071	2.094	2.437	2.737	1.928	140-150	1.604	1476	99.9,99.9
160	2.025	1.908	1.857	1.162	2.614	2.350	2.007	2.392	150-160	0.9477	1477	99.9,99.9
170	1.323	2.870	2.614	3.212	2.081	0.8637	2.307	1.136	160-170	0.5965	1477	100,100
180	1.353	0.9434	0.5042	0.8112	1.355	0.9427	0.5041	0.8129	170-180	0.1605	1478	100,100
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 17.9 %									UNI	T:lm	

#### **Isocandela Diagram:**







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

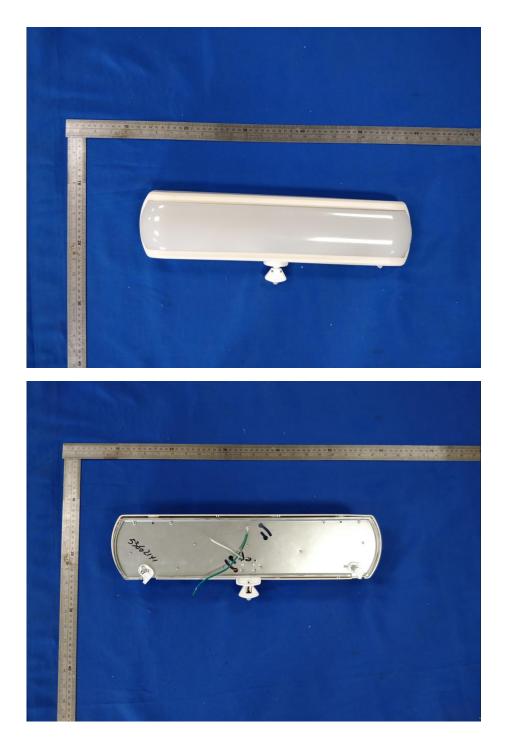
100         15         30         45         60         75         90         105         120         120         125         120	Table1																UNI	T: cd		
100         100         101 <td>C (DEG)</td> <td>0</td> <td>15</td> <td>30</td> <td>45</td> <td>60</td> <td>75</td> <td>90</td> <td>105</td> <td>120</td> <td>135</td> <td>150</td> <td>165</td> <td>180</td> <td>195</td> <td>210</td> <td>225</td> <td>240</td> <td>255</td> <td>270</td>	C (DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
5         646         646         646         646         645				_				<u> </u>				<u> </u>		<u> </u>	<u> </u>			<u> </u>		
10       400       400       401       40		-	_	_		_			_					-		_				
22       660       660       610       111       112       113       112       113       112       113       112       113       112       113       112       113       114       11		-		_		-									-	-	-			
22       660       660       610       111       112       113       112       113       112       113       112       113       112       113       112       113       114       11	15	420	421	421	422	423	424	424	424	423	423	422	421	422	421	422	422	423	423	424
30         990         972         970																				413
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	25	389	391	393	395	396	398	398	398	397	396	394	392	392	392	395	396	398	397	398
40         320         334         337         334         337         334         337         334         332         335	30	369	372	374	377	379	380	380	381	379	378	375	373	373	373	376	377	380	380	380
etc.         gate         gate <t< td=""><td>35</td><td>346</td><td></td><td>352</td><td>356</td><td>358</td><td>360</td><td>360</td><td>360</td><td>358</td><td>356</td><td>353</td><td>350</td><td>350</td><td>350</td><td>355</td><td>356</td><td>359</td><td>359</td><td>360</td></t<>	35	346		352	356	358	360	360	360	358	356	353	350	350	350	355	356	359	359	360
50         282         284         284         284         284         284         283         285         286 <td></td> <td></td> <td></td> <td>_</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>_</td> <td></td> <td>_</td> <td></td> <td></td> <td>_</td> <td></td> <td></td> <td></td>				_								_		_			_			
55       231       237       242       242       243       243       248       245       24		_		_											_					
60         198         204         211         202         227         227         227         228         218         148         148         148         148         148         148         148         148         148         148         149         147         147         148         148         148         148         147         137         158         159         150																				
65         144         172         149         187																_		<u> </u>		
70       130       138       148       155       146       137       134       135       149       157       147       130       137       142       130       137       147       130       137       142       130       137       144       130       137       147       130       137       142       130         80       84       353       64       64       76       97       155       76       97       155       76       97       155       76       97       167       97       167       97       167       97       167       97       167       97       167       167       97       167       167       167       97       167       167       144       160       98       166       97       163       32       114       160       314       137       144       180       114       160       314       110       1140       11		-				_						-								
75       95.5       136       139       132       141       142       142       143       142       143       142       143       142       143       142       143       142       143       141		-		_		-						-			-	-				
86         93.7         74.7         25.5         107         112         122         123         102         12.7         128         14.6         14.7         118         118         113         113         116         116         113         114         11																				
BS         13.4         13.0         62.4         84.1         85.2         100         97.1         19.4         19.4         19.2         19.7         11.5         17.9         19.2         19.7         11.5         17.9         17.9         17.2         17.9         17.2         17.9         17						-						-			-	_				
90         25.4         36.5         56.6         61.8         77.7         78.1         75.2         75.6         45.2         26.6         3.8         3.8         42.6         59.7         68.7         59.7         59.		-	_	_		_		-	_	_						_	_		-	
98         4.46         0.25         2.2         1.4         9.7         2.2         1.2 <td></td> <td></td> <td>_</td> <td>_</td> <td>_</td> <td>_</td> <td></td> <td></td> <td>_</td> <td>_</td> <td>_</td> <td>_</td> <td></td> <td></td> <td>_</td> <td>_</td> <td>_</td> <td></td> <td></td> <td></td>			_	_	_	_			_	_	_	_			_	_	_			
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		_																		
101       13.2       13.2       13.2       14.4       13.2       11.4       13.2       11.2       12.0       13.5       11.3       13.6       13.6       13.2       11.4       13.0       13.6       13.2       13.6		-																		
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		-		_																
111       10.9       9.24       10.1       10.7       11.2       11.2       11.2       11.2       12.9       12.7       12.2       2.27       12.0       9.31       4.61       3.94       4.01       4.16       3.72       2.28       9.77       4.61       3.94       4.21       5.42         120       9.32       5.78       5.50       1.60       2.77       3.89       2.71       2.86       3.22       5.78       3.89       2.71       2.86       3.22       3.78       3.89       2.71       2.86       2.87       3.89       2.71       2.86       2.73       3.89       2.71       2.86       2.27       3.89       2.71       2.86       2.87       3.89       2.71       2.86       4.29       3.83       3.22       2.86       4.39       3.81       2.85       2.87       3.80       3.97       3.93       3.82       2.86       4.39       3.82       2.86       4.39       3.83       3.82       2.86       4.39       3.83       2.85       2.88       2.88       2.88       2.88       2.88       2.88       2.88       2.88       2.88       2.88       2.88       2.88       2.88       2.88       2.88       2.88 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>																				
120       9.31       7.92       7.99       6.37       7.19       6.30       6.4       4.07       6.20       6.31       6.41       6.41       6.41       6.41       6.41       6.33       5.51       6.30       6.11       6.61       6.31       6.33       5.51       6.35       7.81       6.35       7.81       7.92       7.91       <		-				_												<u> </u>		
125       8.02       6.04       6.47       4.97       5.81       4.01       4.16       5.27       2.39       4.33       5.56       1.71       5.99       5.22       5.73       3.68       3.49       2.48       2.33       2.44         135       3.59       5.21       4.07       3.54       2.66       2.32       2.55       3.71       2.56       3.57       3.95       4.22       2.57       3.64       2.42       2.43       2.44         140       3.31       4.57       1.38       3.15       2.55       2.73       2.89       3.00       3.01       3.22       2.68       1.39       3.12       2.07       1.24       2.88       2.85       2.71       2.84       2.80       2.81       1.88       2.81       1.88       2.81       1.88       2.81       1.88       2.81       1.88       2.81       1.88       2.81       1.88       2.81       1.88       2.81       1.88       2.81       1.89       1.82       2.81       1.81       2.81       1.81       2.81       1.81       2.81       1.81       2.81       1.81       1.81       2.81       1.81       2.81       2.81       2.81       2.81       2.81		-				_						-						<u> </u>		
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$				_		_									-					
135       3.59       5.21       4.07       3.54       2.64       2.26       2.26       2.27       2.28       2.27       2.28       2.28       2.29       2.28       2.29       2.29       2.29       2.29       2.29       2.29       2.29       2.29       2.29       2.28       2.29       2.28       2.29       2.28       2.29       2.28       2.29       2.28       2.29       2.28       2.29       2.28       2.29       2.28       2.29       2.28       2.29       2.39       2.30       1.00       3.15       2.00       1.28       2.09       2.39       2.30       1.00       3.15       2.00       1.28       2.30       1.28       1.20       1.28       1.20       1.28       1.20       1.28       1.20       1.28       1.20       1.28       1.20       1.21       1.21       1.22       1.28       2.31       1.44       1.28       1.20       1.29       1.20       1.28       1.20       1.21       1.21       1.23       1.20       1.28       1.29       1.20       1.28       1.20       1.28       1.20       1.28       1.20       1.28       1.20       1.28       1.20       1.28       2.28       2.31       1.40	130	-																		-
140         3.31         4.97         1.38         3.15         2.86         2.82         2.86         4.39         3.12         3.86         2.82         2.82         2.82         2.82         2.82         2.82         2.82         2.82         2.82         2.82         2.82         2.82         2.82         2.82         2.82         2.82         2.82         2.84         1.02         3.15         2.86         2.44         1.21         1.92         2.44         1.21         1.92         2.44         1.21         1.92         2.44         1.21         1.92         2.44         1.21         1.92         2.44         1.21         1.92         2.44         1.21         1.92         2.44         1.21         1.93         1.42         1.93         1.42         1.93         1.42         1.93         1.32         1.44         1.93         2.13         1.14         1.92         2.74         2.44         1.93         2.71         2.41         1.93         2.71         2.41         1.93         1.92         1.93         1.92         1.93         1.92         1.93         1.92         1.93         1.92         1.93         1.92         1.93         1.92         1.93         1.93 <th< td=""><td>135</td><td>3.59</td><td>5.21</td><td>4.07</td><td>3.54</td><td>2.66</td><td></td><td>2.56</td><td>2.71</td><td></td><td>3.59</td><td>3.76</td><td>3.37</td><td>2.95</td><td>4.32</td><td>2.57</td><td></td><td>2.53</td><td>2.42</td><td>2.42</td></th<>	135	3.59	5.21	4.07	3.54	2.66		2.56	2.71		3.59	3.76	3.37	2.95	4.32	2.57		2.53	2.42	2.42
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	140	3.31	4.57					2.87						3.12	3.86	2.02				
155         2.35         2.44         2.00         0.72         1.92         2.03         1.94         2.01         1.12         2.07         3.92         2.86         1.46         2.91         1.96         1.97         2.33         1.14           160         2.08         2.43         3.01         1.91         0.70         1.20         1.46         1.18         3.03         3.23         2.61         1.26         2.19         2.77         2.77         2.60         3.16         2.08         2.09	145	2.57	3.88	0.49	2.25	2.52	2.73	2.93	3.00	3.07	2.36	1.78	4.10	2.49	3.12	2.07	1.26	2.88	2.85	2.78
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	150	2.21	2.62	1.52	1.71	2.04	2.71	2.88	2.99	2.39	2.07	1.09	3.15	2.09	1.88	2.50	2.44	1.21	1.89	2.74
165         2.18         2.54         3.20         2.65         2.39         1.62         1.72         2.77         2.60         3.18         2.70         2.41         1.89         1.67         2.39         2.60         2.58         2.35         2.36         2.60         1.74         1.82         0.30         2.01         2.37         2.41         1.89         1.67         2.39         2.60         2.41         1.89         1.67         2.39         2.60         2.41         1.89         1.61         2.08         2.60         2.41         1.89         1.61         2.08         2.60         2.41         1.89         1.61         1.62         0.30         1.61         1.81         1.81         1.61         1.81         1.61         1.61         1.65         1.61 <th< td=""><td>155</td><td>2.35</td><td>2.84</td><td>2.00</td><td>0.72</td><td>1.95</td><td>2.03</td><td>1.96</td><td>2.08</td><td>2.11</td><td>1.26</td><td>3.07</td><td>3.92</td><td>2.86</td><td>1.49</td><td>2.91</td><td>1.96</td><td>1.97</td><td>2.13</td><td>1.14</td></th<>	155	2.35	2.84	2.00	0.72	1.95	2.03	1.96	2.08	2.11	1.26	3.07	3.92	2.86	1.49	2.91	1.96	1.97	2.13	1.14
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	160	2.02	2.34	3.01	1.91	0.70	1.20	1.86	1.57	0.60	1.16	3.30	3.53	2.61	1.26	2.49	2.35	1.46	2.18	2.01
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	165	2.18	2.54	3.20	2.65	2.39		1.23	1.57	2.77	2.60	3.18	2.70	2.41	_	1.67	2.39	2.08	2.58	2.37
180         1.35         1.29         1.99         0.94         0.78         0.13         0.50         0.40         0.78         0.81         1.05         1.26         1.35         1.29         1.09         0.78         0.14         0.50           Table2         UNIT: cd         UNIT: cd           0         437         437         437         437         437         437         437         435 <t< td=""><td>170</td><td>1.32</td><td></td><td>2.43</td><td>2.87</td><td>_</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2.04</td><td>2.27</td><td></td></t<>	170	1.32		2.43	2.87	_												2.04	2.27	
Table2         UNIT: cd           0         437         4	175						2.42	2.57	2.59	2.40	1.98	1.83	1.84	2.09	1.98	1.75	1.47		0.55	0.61
100         437         438         438         438 <th>C (DEG)</th> <th>285</th> <th>300</th> <th>315</th> <th>330</th> <th>345</th> <th></th>	C (DEG)	285	300	315	330	345														
5       435       435       435       435       435       435       435       435       435       420       1		437		437	437	437		-		-		<u> </u>		-		-	-			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		-						-		-						-	-			
20       412       411       409       408       406 <t< td=""><td>10</td><td>431</td><td></td><td></td><td>430</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	10	431			430															
25       397       396       393       392       389	15	423	422	421	420	419														
30       379       378       373       369       1	20	412	411	409	408	406														
35       358       357       353       350       347 <t< td=""><td>25</td><td>397</td><td>396</td><td>393</td><td>392</td><td>389</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	25	397	396	393	392	389														
40       335       333       329       326       321       1 <t< td=""><td>30</td><td>379</td><td>378</td><td>375</td><td>373</td><td>369</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	30	379	378	375	373	369														
45       309       307       303       299       294       1 <t< td=""><td>35</td><td>358</td><td>357</td><td>353</td><td>350</td><td>347</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	35	358	357	353	350	347														
50       281       279       270       285   <	40	335	333	329	326	321														
55     252     250     244     240     234     240     244     241 <td></td> <td></td> <td></td> <td></td> <td><u> </u></td> <td><u> </u></td> <td></td>					<u> </u>	<u> </u>														
60       223       220       214       208       201						<u> </u>		-		-				-			-			
65       194       189       183       175       168       1       168       1       168       1       168       1       168       1       168       1       168       1       168       1       168       1       168       1       168       1       168       1       168       1       168       1       168       1       168       1       168       1       168       1 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td>-</td><td>-</td><td></td><td><u> </u></td><td></td><td>-</td><td></td><td></td><td></td><td><u> </u></td><td></td><td></td></t<>								-	-	-		<u> </u>		-				<u> </u>		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$					<u> </u>			-	-	-				-		-	-			-
15     140     134     124     113     101 <td></td> <td></td> <td></td> <td></td> <td><u> </u></td> <td></td> <td></td> <td>-</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> <td>-</td> <td>-</td> <td></td> <td>-</td> <td></td> <td></td> <td>-</td>					<u> </u>			-	-	-				-	-		-			-
80         116         109         98.9         85.5         70.4           85         93.4         86.8         76.0         62.8         46.6         1           90         71.9         66.4         56.4         63.1         4         1         1           95         46.7         31.2         3.99         6.72         4.57         1         1           95         46.7         31.2         3.99         6.72         4.57         1         1         1           100         1.10         5.76         12.6         21.3         5.58         1         1         1           101         1.2         13.1         12.4         12.1         3.60         1         1           115         8.68         9.82         2.98         1 <td></td> <td></td> <td></td> <td></td> <td><u> </u></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td>					<u> </u>			-									-			
85         93.4         86.8         76.0         62.8         46.6         1 <th1< th=""> <th1< th=""></th1<></th1<>								-	-	-	-	-		-	-		-	-		
90         71.9         66.4         56.6         44.6         31.4         1           95         48.7         31.2         3.98         6.72         4.57         1			_					-		-	-	<u> </u>			-		-	<u> </u>		
95       48.7       31.2       3.99       6.72       4.57			_			<u> </u>														
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		-	_																	
105       15.5       18.0       16.8       15.8       4.35         110       13.2       13.1       12.4       12.1       3.60         115       8.6       9.32       9.38       9.81       2.98          120       5.57       6.05       6.94       8.45       2.41           120       5.57       6.05       6.94       8.45       2.41            130       2.27       3.09       4.66       6.19       1.18            130       2.27       3.09       4.66       6.19       4.18             140       2.32       2.50       3.07       3.16       4.80             150       1.73       1.03       1.93       2.36               150       1.73       1.03       1.93       2.36       1.97 <td></td> <td></td> <td>_</td> <td></td> <td><u> </u></td> <td></td>			_		<u> </u>															
110       13.2       13.1       12.4       12.1       3.60       Image: state			_																	
115       0.68       9.32       9.38       9.81       2.98																				
120     5.77     6.05     6.94     8.45     2.41 <td>115</td> <td>8.68</td> <td>9.32</td> <td>9.38</td> <td>9.81</td> <td>2.98</td> <td></td>	115	8.68	9.32	9.38	9.81	2.98														
130       2.27       3.09       4.86       6.19       4.18	120	5.57		6.94																
135       2.14       2.76       4.10       4.29       5.36	125																			
140       2.32       2.50       3.07       3.16       4.80	130																			
145       2.49       2.39       1.67       1.49       3.85																				
150       1.73       1.03       1.93       2.06       1.97	140																			
155       1.72       1.98       1.71       2.14       1.66       Image: Constraint of the			2.39																	
160         1.72         1.68         2.39         2.40         0.91           165         2.17         2.14         1.64         0.79           170         2.45         2.33         1.44         0.65         1.15           175         0.67         0.66         0.47         0.78         0.86	145				2 36	1 97														
165         2.17         2.14         1.84         1.43         0.79         Image: Constraint of the constraint of	145 150	1.73																		
170         2.45         2.35         1.14         0.65         1.15	145 150 155	1.73	1.98	1.71	2.14	1.66					<u> </u>	<u> </u>		-	<u> </u>			<u> </u>		
175 0.67 0.66 0.47 0.78 0.86	145 150 155 160	1.73 1.72 1.72	1.98 1.68	1.71 2.39	2.14 2.40	1.66 0.91														
	145 150 155 160 165	1.73 1.72 1.72 2.17	1.98 1.68 2.14	1.71 2.39 1.84	2.14 2.40 1.43	1.66 0.91 0.79														
180   0.39   0.78   0.81   1.05   1.26	145 150 155 160 165 170	1.73 1.72 1.72 2.17 2.45	1.98 1.68 2.14 2.35	1.71 2.39 1.84 1.14	2.14 2.40 1.43 0.65	1.66 0.91 0.79 1.15														
	145 150 155 160 165 170 175	1.73 1.72 1.72 2.17 2.45 0.67	1.98 1.68 2.14 2.35 0.66	1.71 2.39 1.84 1.14 0.47	2.14 2.40 1.43 0.65 0.78	1.66 0.91 0.79 1.15 0.86														





## Photo of Sample:

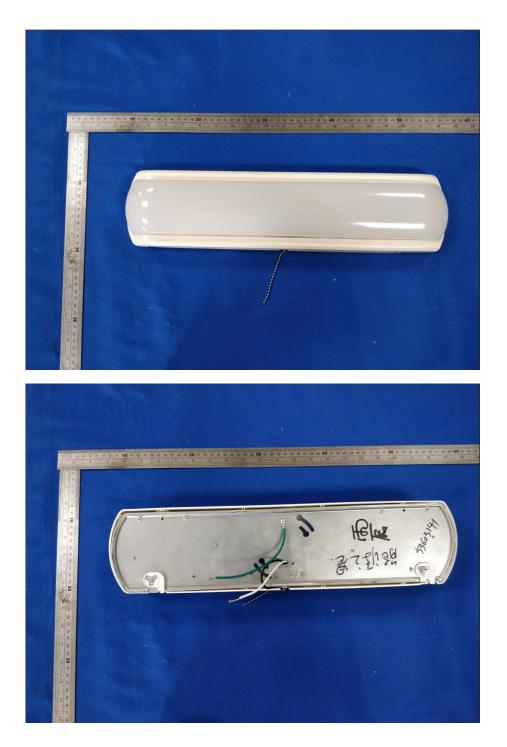
536021##







536031##







## **Equipment List:**

quipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2017-11-18	2018-11-17
NTC-F01-006	2.0 meter Integrating Sphere	2017-11-18	2018-11-17
NTC-F01-012	Standard Lamp	2017-11-18	2018-11-17
NTC-F01-013	Standard Lamp	2017-11-18	2018-11-17
NTC-F01-031	Digital Power Meter	2017-11-18	2018-11-17
NTC-F01-019	Temperature & Humidity Meter	2017-11-23	2018-11-22