

# IES LM-79-08


## MEASUREMENT AND TEST REPORT

For

### Soraa Inc.

6500 Kaiser Drive, Fremont, CA 94555

**Test Model: SP30S-18-60D-830-03**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution, Spatial Non-uniformity of Chromaticity
<b>Test Engineer:</b>	Daniel Duan 
<b>Report Number:</b>	R2DG160322057-10A1
<b>Test Date:</b>	2016-03-26 to 2016-03-28
<b>Report Date:</b>	2016-03-28
<b>Reviewed By:</b>	Jeanne Han/Safety Manager 
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008
<b>Test Facility:</b>	Test facility was located at Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China.

## 1. Product Description

### General Information:

One sample was received on 2016-03-22 and used for testing.

Model Tested: SP30S-18-60D-830-03  
 Manufacturer: Soraa Inc.  
 Brand Name: Soraa Inc  
 Product Designation: LED PAR30S  
 Burning Time Before Test: 0hour(For New Products)

### Rated Values:

Rated Voltage/Frequency: 100-120 V AC 50/60Hz  
 Rated Power: 18.5 W  
 Nominal CCT: 3000K  
 Nominal Lumen Output: 1280 lm

## 2. Standards Used

- IESNA LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
- ANSI C82.77-2002: Harmonic Emission Limits – Related Power Quality Requirements for Lighting

## 3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
2.0m integrating sphere	EVERFINE	R98	11010018	R98	2015-11-09	2016-11-08
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	380-780nm	2016-03-10	2017-03-09
DC Power Supply	EVERFINE	WY305-V1	1101047	30V/5A	2015-07-27	2016-07-26
Thermal Meter	Anymetre	JR900A	N/A	25°C	2016-01-12	2017-01-11
Standard Light Source	SENSING	N/A	LSD090808	N/A	2015-09-25	2016-09-24
AC Power Supply	EVERFINE	DPS1010-YF	1011001T	30V/5A	2016-03-04	2017-03-03
AC Power Supply	EVERFINE	VPS1030 PWM	1012017	0-150V, 0-300V	2016-03-04	2017-03-03
DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2016-03-04	2017-03-03
Power Meter	YOKOGAWA	WT-210	91KB35700	15/30/60/150/300/600 V	2016-03-04	2017-03-03
Goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	1600mm,3000W/10A	2016-03-10	2017-03-09
Wireless Remote Sensor	N/A	433MHz	N/A	0°C~50°C;-20°C~60°C	2016-03-23	2017-03-22
Standard Light Source	EVERFINE	D908	1012003	N/A	2015-09-08	2016-09-07

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Shenzhen) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

## 4. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with IES LM-79-08. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$  during measurement. And relative humidity is less than 65%.

### **Integrating Sphere System**

The system includes AC power source, digital power meter, DC power supply, spectrophotometer, and integrating sphere. The integrating sphere system is calibrated by standard light source before measurement.

$4\pi$  geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

The uncertainty of the light output (luminous flux) measurements is  $U=2.1\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=32\text{K}$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the CRI is  $U=2.1$  ( $K=2$ ), at the 95% confidence level.

### **Goniophotometer System**

The goniophotometer system is calibrated by standard light source before measurement.

Type C goniophotometer was used for measuring total luminous flux, luminous intensity distribution, and color spatial uniformity. The product was operated in its intended orientation in application and was recorded in this report.

The uncertainty of the luminous intensity is  $U=2.82\%$  ( $K=2$ ), at the 95% confidence level.

## 5. Test Result

### [Integrating Sphere System]

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Base up**

#### Electrical Measurement

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	59.98	0.1545	18.16	0.9801

#### Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
1428.0	4.8717	78.62	2968	-3.98E-04

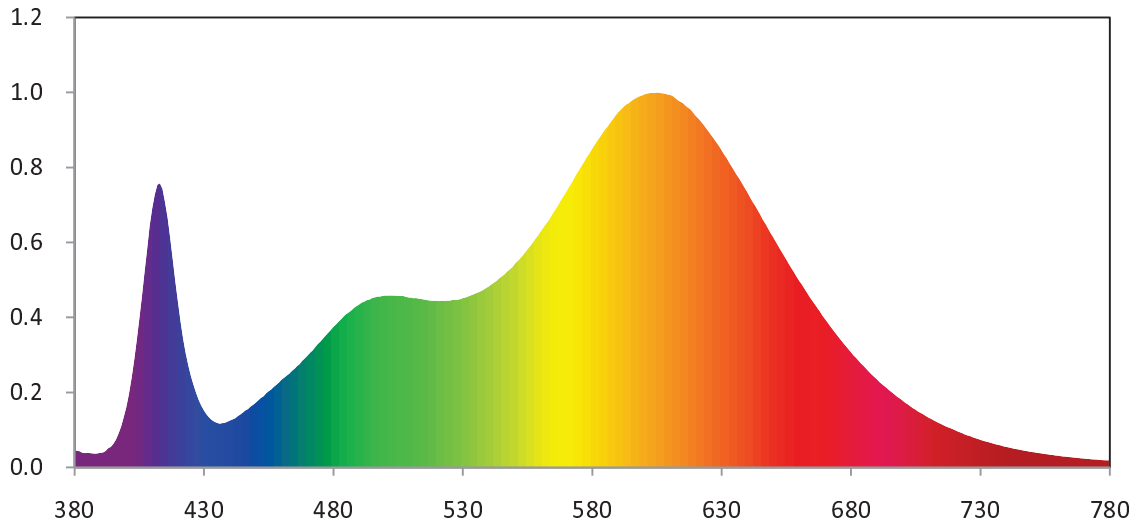
#### Chromaticity Coordinate

x	y	u	v	u'	v'
0.4386	0.4037	0.2518	0.3477	0.2518	0.5215

#### Color Rendering Index

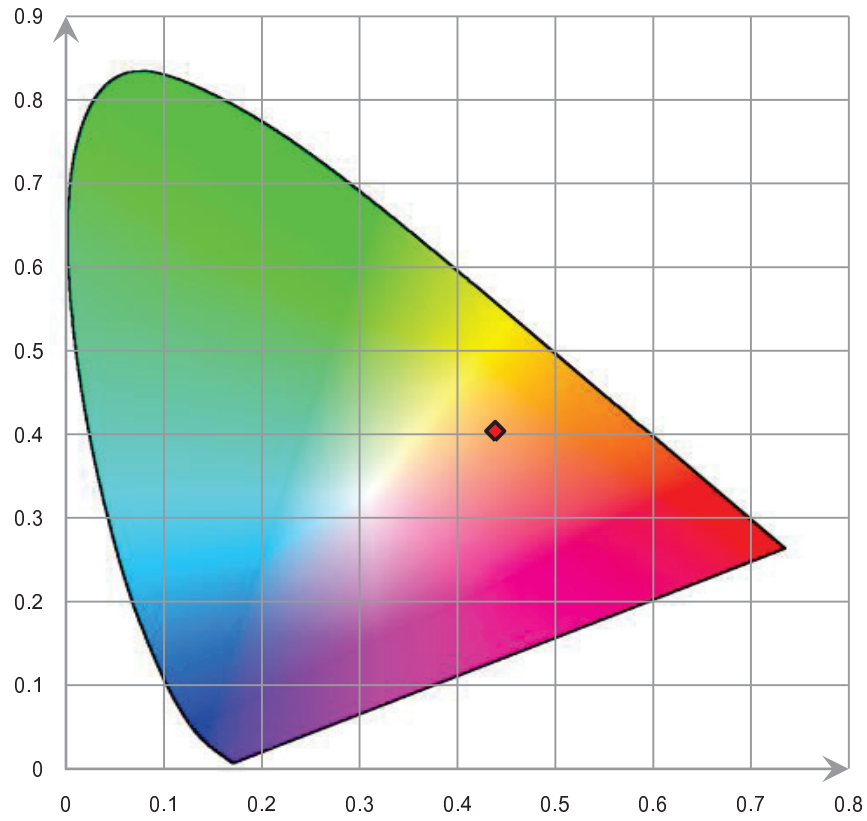
Ra			
86			
R1	R2	R3	R4
86	98	88	86
R5	R6	R7	R8
90	97	82	62
R9	R10	R11	R12
19	97	87	88
R13	R14	R15	
89	93	78	

Relative Spectral Power Distribution

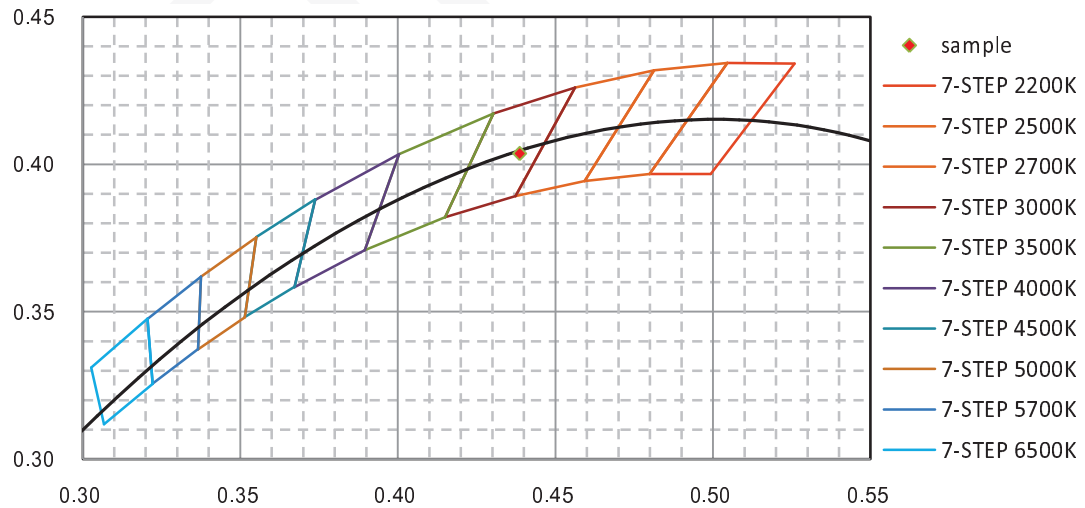


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.226E+00	465	2.480E+00	550	2.031E+01	635	3.876E+00	720	4.443E+00
385	1.229E+00	470	2.989E+00	555	1.932E+01	640	3.651E+00	725	4.574E+00
390	1.184E+00	475	3.674E+00	560	1.819E+01	645	3.469E+00	730	4.728E+00
395	1.079E+00	480	4.399E+00	565	1.670E+01	650	3.343E+00	735	4.903E+00
400	1.048E+00	485	5.344E+00	570	1.511E+01	655	3.263E+00	740	5.077E+00
405	1.066E+00	490	6.476E+00	575	1.351E+01	660	3.196E+00	745	5.190E+00
410	1.054E+00	495	7.771E+00	580	1.204E+01	665	3.235E+00	750	5.409E+00
415	1.027E+00	500	9.229E+00	585	1.061E+01	670	3.254E+00	755	5.564E+00
420	1.009E+00	505	1.080E+01	590	9.352E+00	675	3.335E+00	760	5.697E+00
425	1.032E+00	510	1.242E+01	595	8.298E+00	680	3.424E+00	765	5.885E+00
430	1.078E+00	515	1.417E+01	600	7.428E+00	685	3.503E+00	770	6.039E+00
435	1.094E+00	520	1.583E+01	605	6.651E+00	690	3.584E+00	775	6.201E+00
440	1.202E+00	525	1.760E+01	610	6.016E+00	695	3.738E+00	780	6.408E+00
445	1.409E+00	530	1.890E+01	615	5.438E+00	700	3.859E+00		
450	1.503E+00	535	1.991E+01	620	4.921E+00	705	4.001E+00		
455	1.729E+00	540	2.063E+01	625	4.508E+00	710	4.163E+00		
460	2.035E+00	545	2.073E+01	630	4.164E+00	715	4.259E+00		

CIE 1931 x y Chromaticity Diagram



7-Step & 4-Step Chromaticity Quadrangles



**[Goniophotometer System]**

Total operating time for luminous intensity distribution: **1.0 hour**

Test orientation: **Base up**

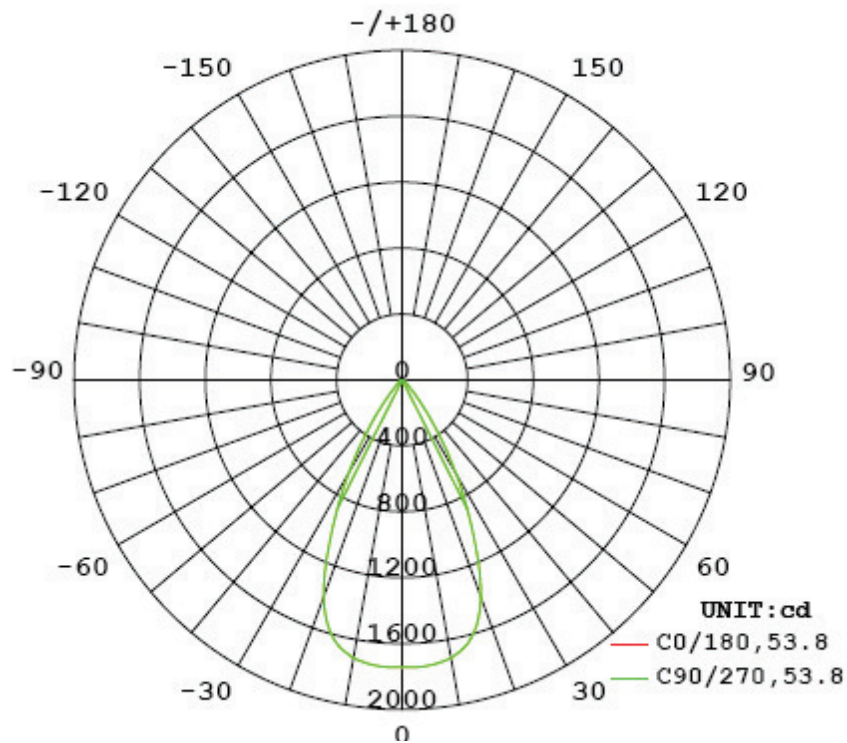
**Electrical Measurement**

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.02	60	0.1543	18.23	0.9844

**Photometric Measurement**

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
1437.9	78.88	1745	0.81	0.81

**Luminous Intensity Distribution**



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	53.8	53.8	53.8	53.8	53.8
Field Angle (10% I <sub>max</sub> ):	78.9	78.9	78.9	78.9	78.9

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1743	1743	1743	1743	1743	1743	1743	1743
5.0°	1740	1740	1740	1740	1740	1740	1740	1740
10.0°	1712	1712	1712	1712	1712	1712	1712	1712
15.0°	1623	1623	1623	1623	1623	1623	1623	1623
20.0°	1402	1402	1402	1402	1402	1402	1402	1402
25.0°	1018	1018	1018	1018	1018	1018	1018	1018
30.0°	662	662	662	662	662	662	662	662
35.0°	354	354	354	354	354	354	354	354
40.0°	160	160	160	160	160	160	160	160
45.0°	70	70	70	70	70	70	70	70
50.0°	44	44	44	44	44	44	44	44
55.0°	33	33	33	33	33	33	33	33
60.0°	23	23	23	23	23	23	23	23
65.0°	20	20	20	20	20	20	20	20
70.0°	19	19	19	19	19	19	19	19
75.0°	14	14	14	14	14	14	14	14
80.0°	8	8	8	8	8	8	8	8
85.0°	1	1	1	1	1	1	1	1
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	0	0	0	0	0	0
130.0°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	1	1	1	1	1	1	1	1
145.0°	1	1	1	1	1	1	1	1
150.0°	1	1	1	1	1	1	1	1
155.0°	1	1	1	1	1	1	1	1
160.0°	2	2	2	2	2	2	2	2
165.0°	2	2	2	2	2	2	2	2
170.0°	2	2	2	2	2	2	2	2
175.0°	2	2	2	2	2	2	2	2
180.0°	1	1	1	1	1	1	1	1

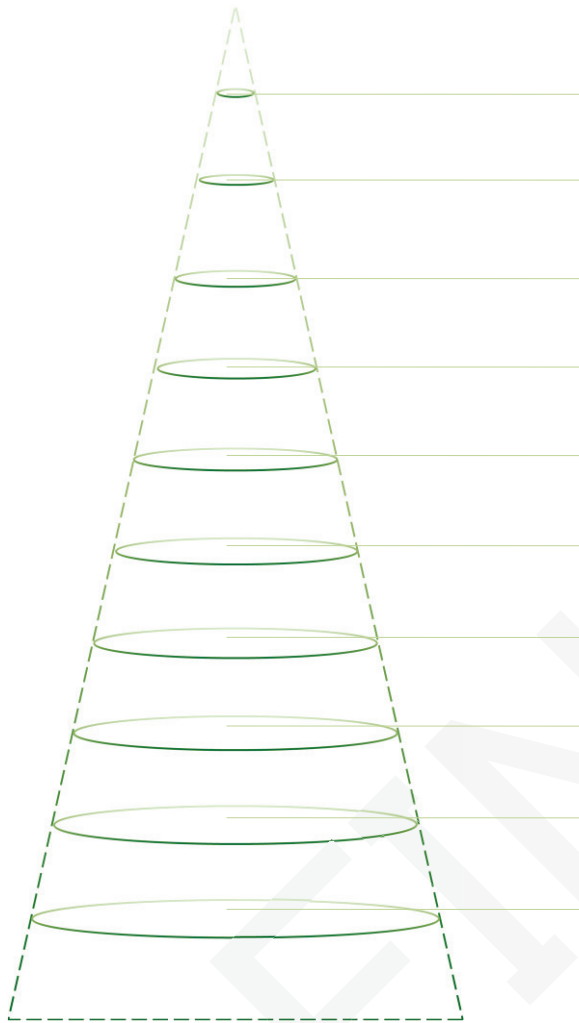


Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1743	1743	1743	1743	1743	1743	1743	1743
5.0°	1740	1740	1740	1740	1740	1740	1740	1740
10.0°	1712	1712	1712	1712	1712	1712	1712	1712
15.0°	1623	1623	1623	1623	1623	1623	1623	1623
20.0°	1402	1402	1402	1402	1402	1402	1402	1402
25.0°	1018	1018	1018	1018	1018	1018	1018	1018
30.0°	662	662	662	662	662	662	662	662
35.0°	354	354	354	354	354	354	354	354
40.0°	160	160	160	160	160	160	160	160
45.0°	70	70	70	70	70	70	70	70
50.0°	44	44	44	44	44	44	44	44
55.0°	33	33	33	33	33	33	33	33
60.0°	23	23	23	23	23	23	23	23
65.0°	20	20	20	20	20	20	20	20
70.0°	19	19	19	19	19	19	19	19
75.0°	14	14	14	14	14	14	14	14
80.0°	8	8	8	8	8	8	8	8
85.0°	1	1	1	1	1	1	1	1
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	0	0	0	0	0	0
130.0°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	1	1	1	1	1	1	1	1
145.0°	1	1	1	1	1	1	1	1
150.0°	1	1	1	1	1	1	1	1
155.0°	1	1	1	1	1	1	1	1
160.0°	2	2	2	2	2	2	2	2
165.0°	2	2	2	2	2	2	2	2
170.0°	2	2	2	2	2	2	2	2
175.0°	2	2	2	2	2	2	2	2
180.0°	1	1	1	1	1	1	1	1

Average Area Illumination Figure

Angle: 53.8°. Flux out: 958.8 lm.



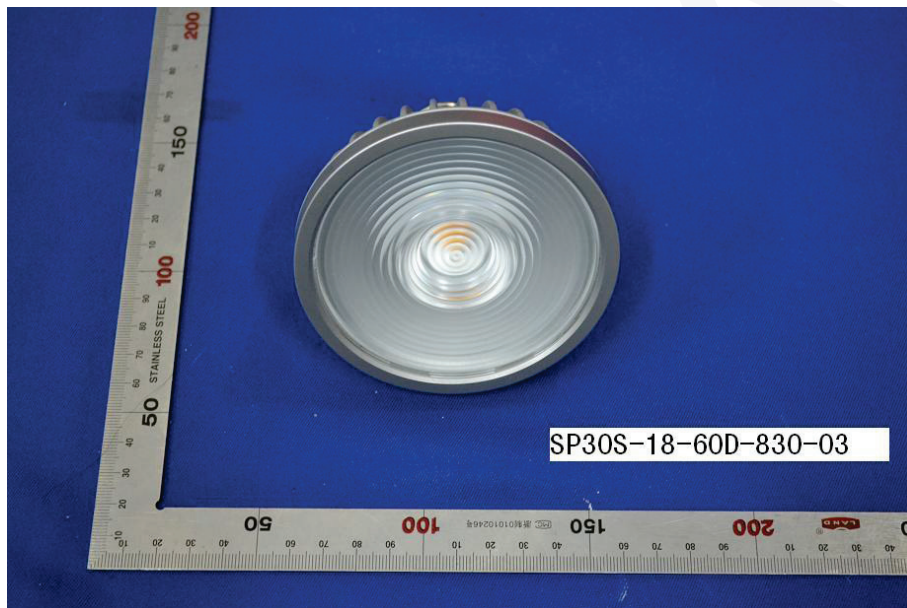
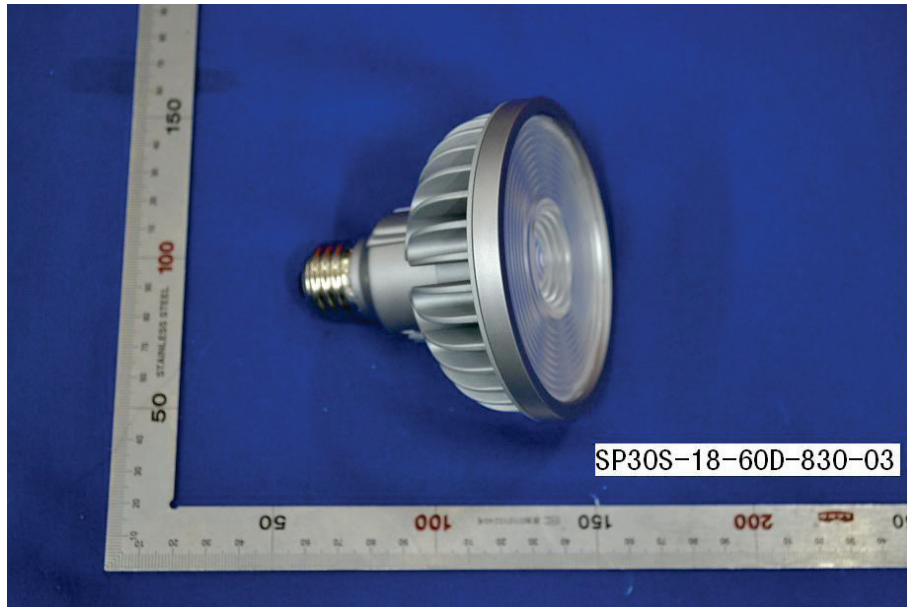
Height (m)	Diameter (cm)	E <sub>avg</sub> (lx)	E <sub>max</sub> (lx)
0.5	50.73	4702.0	6973.0
1.0	101.47	1176.0	1743.0
1.5	152.20	522.5	774.7
2.0	202.93	293.9	435.8
2.5	253.66	188.1	278.9
3.0	304.40	130.6	193.7
3.5	355.13	96.0	142.3
4.0	405.86	73.5	108.9
4.5	456.60	58.1	86.1
5.0	507.33	47.0	69.7

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	41.7	2.90
5-10	123.6	8.59
10-15	198.3	13.79
15-20	250.7	17.44
20-25	254.0	17.67
25-30	210.1	14.61
30-35	146.7	10.20
35-40	81.9	5.70
40-45	39.6	2.76
45-50	22.3	1.54
50-55	16.5	1.15
55-60	12.7	0.89
60-65	10.3	0.71
65-70	9.7	0.68
70-75	9.0	0.63
75-80	5.8	0.40
80-85	2.4	0.17
85-90	0.2	0.01
90-95	0.0	0.00
95-100	0.0	0.00
100-105	0.0	0.00
105-110	0.0	0.00
110-115	0.0	0.00
115-120	0.0	0.00
120-125	0.0	0.01
125-130	0.1	0.00
130-135	0.1	0.01
135-140	0.2	0.01
140-145	0.2	0.02
145-150	0.3	0.02
150-155	0.3	0.02
155-160	0.3	0.02
160-165	0.3	0.02
165-170	0.2	0.02
170-175	0.1	0.01
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	41.7	2.90
0-10	165.3	11.49
0-15	363.5	25.28
0-20	614.3	42.72
0-25	868.3	60.39
0-30	1078.4	75.00
0-35	1225.2	85.20
0-40	1307.1	90.90
0-45	1346.7	93.66
0-50	1369.0	95.20
0-55	1385.5	96.35
0-60	1398.2	97.24
0-65	1408.5	97.95
0-70	1418.2	98.63
0-75	1427.2	99.26
0-80	1433.0	99.66
0-85	1435.4	99.83
0-90	1435.6	99.84
0-95	1435.6	99.84
0-100	1435.6	99.84
0-105	1435.6	99.84
0-110	1435.6	99.84
0-115	1435.6	99.84
0-120	1435.7	99.84
0-125	1435.7	99.85
0-130	1435.7	99.85
0-135	1435.9	99.86
0-140	1436.0	99.87
0-145	1436.3	99.89
0-150	1436.6	99.91
0-155	1436.9	99.93
0-160	1437.3	99.95
0-165	1437.5	99.97
0-170	1437.7	99.99
0-175	1437.9	100.00
0-180	1437.9	100.00

6. Product Photo



\*\*\*\*\*END OF REPORT\*\*\*\*\*